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OF THE

SCIENTIFIC MEETINGS

OF THE

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OF LONDON

FOR THE YEAR

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PROCEEDINGS

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January 13, 1863.

George Busk, Esq., F.R.S., F.Z.S., in the Chair.

Dr. P. L. Sclater called the attention of the Meeting to two rare Fruit-Pigeons living in the Society's Menagerie, both of which he believed to be new to the collection. They had been obtained by purchase from a dealer, and were stated to have come from one of the "South Sea Islands." The species appeared to be *Carpophaga microcera*, Bp., and *Ptilopus fasciatus*, Peale—both of the Samoan Islands, in which group, according to Mr. Peale*, these two Pigeons were frequently kept domesticated by the natives, and carried about in a singular way, upon perches placed at the ends of long stakes.

Mr. W. B. Tegetmeier exhibited a singular variety of the Domestic Fowl, in which the webs of the feathers were broken up into minute filaments.

Mr. Leadbeater exhibited specimens of eggs of a species of *Rhea* (supposed to be those of *Rhea darwini*), obtained by Mr. E. W. Goodlake in Patagonia.

The following letter, addressed to the Secretary by Capt. J. H. Speke, commanding the East-African Exploring Expedition, was read to the Meeting:—

"Kazeh, Africa, February 17, 1861.

"Sir,—I have the honour to forward by down-caravan a few specimens of the fauna of this country, collected by the expedition

* Cassin's 'Mammalogy and Ornithology of the United States Exploring Expedition,' p. 264.

under my command,—they are enumerated below,—and to request, as noticed by my former letters, that you will have them kept in a separate department of the Society's house for me until my return from Africa, when Capt. Grant, my assistant, with myself, will be able to explain the peculiarities of the various animals to you. This lot includes, with those I first sent from Zanzibar, eight packages in all. Most of them have been sent off in the greatest hurry, and consequently without any arrangement, in the hands of passing travellers or caravans; but as they have all been consigned to the care of Mr. Frost, medical officer at Zanzibar, who has kindly offered to officiate for me in sending such things to England, I have no doubt but that they will reach you in very fair order for describing. They affect to nothing else; for it is next to impossible to stuff and take care of animal-specimens properly when travelling with a large caravan, destined for a long journey, and in constant motion. You must therefore take them as you find them, for the present; but I hope they will interest you sufficiently to direct your attention more particularly to these regions; for I am convinced in mind that the great varieties of animal life, large and small, which are to be found here would fully repay any trouble or expense in procuring, and the Society would do well if they could find competent men who would voluntarily spend a few years in collecting them. By far the richest fields for sport, or any kind of animal-collections, which have come under my notice are the regions in and about the East Coast range, but more particularly so near the Kingani and the Wami Rivers, where those streams issue from the range, and trend through beautiful parks and forests. This part should be attended to first, as, by being near the coast, transport would be easy, and the expenses of living a mere trifle.

"To give you some notion of the variety of larger animals which have been observed by the East-African Expedition, I will enumerate them, making notes, and even marks of interrogation, so (?), when I feel in doubt about their identity:—

"1. The Elephant (*E. africanus*) seems general everywhere in the hills or plains.

"2. Rhinoceros. The only variety, from the coast to Ungamwezi, which has been shot or seen is the common black *Rhinoceros bicornis* of the south,—not the Ketloa; but we hear of the White Rhinoceros in the Karagwah Mountains to the north.

"3. Hippopotamus, general.

"4. Pig. This is a very peculiar animal. The boar has four tubercles on the face; but the sow has only two, on the point of the cheek-bones below the eyes. I send sketches of them. Although we have met this pig everywhere on the line of march, we have seen no other variety. [This seems to be a species of *Phacochœrus*.—P. L. S.]

"5. Giraffe, general.

"6. Zebra, general; they make a kind of noise when excited, something like a sheep trying to bleat with a bad cold and cough.

"7. Buffalo (*Bos caffer*), general.

"8. Eland (*Oreas* sp.?). The only specimen shot was in the hill

range; but I believe them to exist, in the interior, on the plateau also. This beast was about the size of a Delhi ox; it has black points, and a broad black band strongly marked on the hinder part of the fore legs, just above the bend of the knee: another peculiarity is that it has white narrow stripes running down the flanks, over the ribs. [No doubt Dr. Livingstone's new species of Eland figured *from recollection* in his Travels?—P. L. S.]

"9. Koodoo? I have certainly knocked some of these animals over, although I never succeeded in bagging one. This was at Usekhe in Ugogo, and there also I have seen their horns and skulls lying on the ground. They appear to go up and hide in small hills covered with bush during the daytime.

"10. Water-Boc, common in the lower lands.

"11. Hartebeest, common.

"12. Brindled Gnu, only seen on the east side of the coast range; they exist there in herds of hundreds.

"13. Bubal? This cream-coloured beast I have followed and wounded, though never killed; it appears larger than the Hartebeest, though somewhat like it in shape and horns. Its characteristic marks are single black patches on the middle of its flanks; and the tail is tipped black. Seen in Dhoors, on the East Coast range, and on the interior plateau.

"14. Pallah (pronounced P'hallah by the Wangamwezi) is one of the commonest animals in this part of Africa; many have been shot, but some appear much larger and of lighter red than others.

"15. *Antilope sœmmerringii*? This elegant creature (if it is the



animal I have named it) was only shot in Ugogo. It is about the

size of the Black Buck of India, and carries itself much in the same way; the female has fine horns*.

"16. Reh Boc, only one specimen shot, in the East Coast range.

"17. Bush-Boc? Seen in the lowlands in thick bush, but never killed.

"18. Duyker Boc, common on the interior plateau.

"19. Stein Boc, common.

"20. *A. saltiana*, common.

"21. Small Boc. This diminutive animal is a trifle darker than a common water-rat; it has short straight horns like the *A. saltiana*, but it is not above one-quarter of that size. I have seen the animal alive in the jungle, and have had a skin of one, but never obtained this Antelope entire.

"22. Zanzibar Boc.

"23. Strange Boc. The only specimen obtained of this was sent home; and as that was young and looked like a small red calf, more than anything else, I will leave it for future reference.

"24. *A. saltatrix*. This little Klipspringer was only shot in one place, on some rugged granitic outcrops in the interior plateau.

"25. Lion heard everywhere, but never seen.

"26. *Hyæna crocuta*, the common scavenger of the country.

"27. Variegated Hyæna. The size and shape of a large Wolf, long large ears; gallops fast, and in packs, and barks like a dog, for which cause it is called the Jungle-Dog by the natives. Three rushed out of the bush, with loud barks, one day to attack me; but they pulled up and went to the right about as soon as I turned round to shoot at them.

"28. Silver Fox, common.

"29. Small dark-brown Fox, very large ears and black points.

"30. Wild Cat.

"31. Ruddy Lynx.

"32. Hyrax.

"33. *Mungos fasciatus*.

"34. Squirrel.

"35. Yellow Ferret.

"36. Dark Chestnut Ferret.

"37. Hares, 4½ lbs. weight.

"38. Rats, in many varieties.

"39. Mice, the same.

"40. Moles, peculiar.

"41. Hedgehog.

"42. Tortoise, two varieties.

"I may remark that I have not seen in the part of the hill range traversed by this expedition the same peculiar four-horned Antelope which I once saw in the Usumbara Mountains, a little to the northward; and further, I feel convinced that I have seen the prints and

[* There seems little doubt about this Antelope (of the horns of which Capt. Speke sends a sketch—see Woodcut) being new. Dr. Gray is of this opinion.—P. L. S.]

other signs of large and small Antelopes which have not been shot by the expedition, and so also of other animals not considered game, by which it will appear that there is much left for the naturalist or sportsman to bring up on this branch of natural history alone, to say nothing of the birds, reptiles, and insects which, by closer examination than I was formerly able to devote to it, I can now venture to say comprise a variety of genera and species so great as few other countries can boast of. There are, however, but few birds of prey; and the other birds, though of great variety, are seldom to be found of gaudy plumage. The game-birds too are not so numerous as those usually classed as common birds, and, as far as my experience goes, I may enumerate them as—

"1. The Ostrich.

"2. Bustard.

"3. Three varieties of Floriken: of these, specimens of two sorts have been sent home; and the third one is a larger bird with a black body and white wings, something resembling the common large Floriken of Bengal.

"4. Three different species of Partridge.

"5. Two sorts of Guinea-fowl.

"6. Quails, Common and Bush.

"7. Geese.

"8. Duck.

"9. Snipe.

"Of Snakes, poisonous as well as other ones are not uncommon, and in some places very numerous. Lizards comprise an interesting variety; whilst the Insectivorous birds are of all descriptions, and in vast numbers."

Continuation of the above letter.

"Kazeh, 10th March, 1861.—Since writing the above letter I had reason to believe that two species of Antelopes, which I had not met with, were to be found in the jungles not far distant from this—the Sable Antelope and the Blau-Boc. I accordingly went there, and have now satisfied myself of the existence of both by personal inspection. The Sable Antelope appeared very scarce, for in six days' constant shooting I only saw one; but the Blau-Bocs were more common. The specimen of this latter animal which I send you was pulled down by Lions after the forearm had been broken by a bullet.

"Kazeh, 7th May, 1861.—I have just returned from Mininga to this place, and find, to my surprise, that I never concluded this letter (by attaching a list of the birds and animals) before the expedition departed. I now cannot do so from memory, the specimens being in most part encased in tin; but I am adding twenty-two birds and one Wild Cat to the collection. There are also a few rough sketches which I should like you to keep for me, painted on nine separate sheets of block-paper. It is now more than six weeks since the expedition left Kazeh; and in that time I find all the large birds, Vul-

tures, Falcons, Hawks, &c., have been so much destroyed by insects that I have thought it better to throw them away.

"I remain, Sir,
"Your obedient servant,
"J. H. SPEKE,
"Captain Commanding E. African Expedition."

"P.S. A Leopard was shot here last night."

"*P. L. Sclater, Esq.*,
Secretary, Zoological Society,
London."

The following papers were read:—

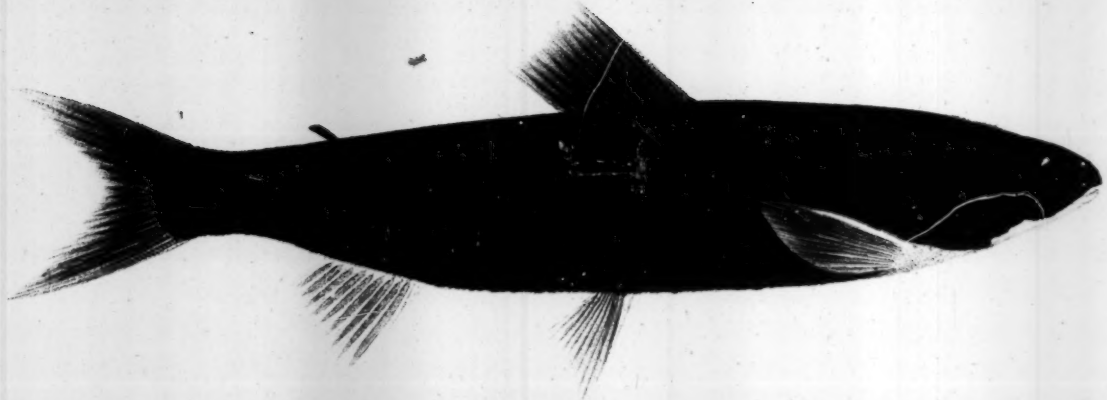
1. CONTRIBUTIONS TO THE KNOWLEDGE OF THE BRITISH CHARRS. PART II. BY ALBERT GÜNTHER, M.A., PH.D., M.D., F.Z.S.

(Plates I. & II.)

Since the publication of my first paper on this peculiar group of *Salmonidæ**, I have received very valuable materials for prosecuting my researches. The additional specimens show that I have been correct in distinguishing the three British species from those of the Continent and from one another, and that the differences between the young and mature fish of one species may be apparently greater than between individuals of the same age but of two distinct species—the laws according to which the changes in the external form proceed from the young to the mature age appearing to be the same in the different species, as far as our present experience goes. It has been observed, in allied species of insects, that, whilst the perfect animals are so completely alike as to be scarcely distinguishable, their larvæ are very different in their external characters, and even in their habits. This is not the case with the Charrs: the young individuals of two species differ as much from each other as the old ones. But in order to find out the distinctive characters of two species, it is always necessary to compare specimens of the same age. This can be ascertained by the examination of the generative organs, by the development of the jaws, and finally by comparison of a series of examples from the same locality, assisted by actual observation or information from persons who have been for years acquainted with the Charrs of a certain locality, and know to what size they attain there.

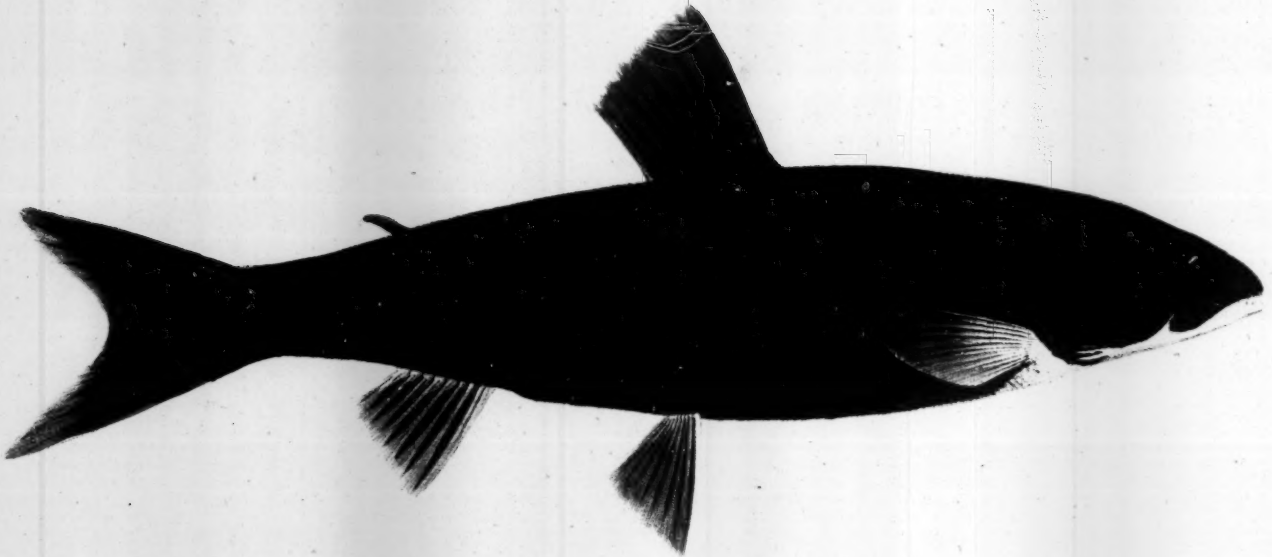
Among mammals and birds, difference in the size of full-grown animals is admitted as a specific character, whilst ichthyologists have scarcely ever used it as a distinction between closely allied species, because numerous fishes continue to grow for an almost indefinite period after they have attained to maturity. However, if we should be able to ascertain for a series of fishes the age or the size at which they *first* attain to maturity, the differences observed might be of as

* Proceedings of this Society, 1862, p. 37.



SALMO NIGER

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J. Juby, lith.

M. & N. Hanhart, Imp.

SALMO COMII

BRITISH MUSEUM
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great value for the distinction of the species of fishes as in the higher classes of vertebrate animals. I have been induced to make these remarks by the fact (to which we shall recur in the progress of this paper) that the *Salmo alpinus* of Scotland attains maturity at a size inferior to that of an immature Swedish *Salmo alpinus*. Now, if such a difference in the size should be considered as a specific character at a future time, the Scotch and Swedish fishes would be separated.

The specimens which I have examined since the publication of the first paper are the following; they have been deposited in the Collection of the British Museum:—

a. *Salmo salvelinus*, Nilss.

A large male specimen from the Lake of Wettern; presented by Professor Liljeborg.

b. *Salmo alpinus*, L.

A young male from Lapland; presented by Prof. Liljeborg.

Four adult males from Quickjock (Lapland); sent by Mr. Wheelwright.

Two immature specimens from Lake Helier in Hoy, Orkneys; presented by Dr. W. Traill.

Five adult specimens, males and females, from Scotland; purchased of Mr. Stevens.

c. *Salmo willughbii*.

Many mature male and female specimens from Loch Bruiach; presented by Lord Lovat.

d. *Salmo nivalis*.

Two very fine immature specimens; presented by G. G. Fowler, Esq.

e. *Salmo grayi*.

Many adult males from Lough Melvin; presented by the Earl of Enniskillen.

An adult female; purchased of Mr. Stevens.

f. *Salmo colii*, n. sp.

Many specimens from Lough Eske; presented by the Earl of Enniskillen and by T. Brooke, Esq.

A female specimen from Lough Dan, co. Wicklow; presented by R. H. Scott, Esq.

Before proceeding to the detailed remarks on these six species, I must express my best thanks to the gentlemen mentioned for their assistance, which was accompanied by much valuable information.

a. *Salmo salvelinus* (L.), Nilss.

Diagnosis, taken from a male specimen from the Lake of Wettern, 17 inches long.—Body slightly compressed and elongate, its greatest depth being contained five times and a half in the total length (to

the end of the middle caudal rays). The length of the head exceeds the height of the body, being contained four times and a half in the total; it is rather more than one-half of the distance between the snout and the vertical from the origin of the dorsal fin. The maxillary extends beyond the orbit in the adult fish. Eye rather small, its diameter being less than one-half of the interorbital space. The length of the pectoral fin of the mature fish is equal to, or less than, one-half of the distance of its base from the root of the ventral. Dorsal rays fourteen*; the length of its longest ray is much less than that of the pectoral, and not much more than one-half of the length of the head; the length of its base is twice that of its last ray. 190 transverse series of scales above the lateral line. Vertebræ 65. Teeth of moderate size.

This species is not represented by any of the British Charrs that I have examined. The Irish Charrs form quite a distinct group, the characters of which I shall point out hereafter. *S. willughbii* and *S. cambricus* have larger scales, much longer pectoral fins, and differ besides in many other points. *S. alpinus* has the same number of scales; but in specimens of a corresponding age and size the pectorals are much longer, the maxillary is less developed, &c. The Iceland Charr has the dorsal fin much more elevated. This Swedish *S. salvelinus* may be identical with a part of the specimens comprised by Heckel under the same name.

b. *Salmo alpinus*, L.

Diagnosis.—Body slightly compressed and elongate, its greatest depth being one-fifth or one-sixth of the total length (to the end of the middle caudal rays). The length of the head equals the height of the body in mature specimens, but is somewhat more in immature; it is two-ninths or one-fifth of the total; it is rather less than, or equal to, one-half of the distance between the snout and the vertical from the origin of the dorsal fin. The maxillary extends but little beyond the orbit in the fully adult fish. The eye is one-half, or rather less than one-half, of the width of the interorbital space. The length of the pectoral of the mature fish is more than one-half of the distance of its base from the root of the ventral; in immature specimens its length is considerably less. Dorsal rays thirteen; the length of the longest ray is much less than that of the pectoral, and three-fifths or one-half of the length of the head; the length of its last ray is a little more than one-half or two-thirds of the length of its base. 195–200 transverse series of scales above the lateral line. Vertebræ 62 in the Scandinavian variety, and 59 in the Scottish. Teeth of moderate size.

At the time when I first compared the Charrs of Windermere and Llanberris† with Linné's and Nilsson's descriptions of *Salmo alpinus*, I had not had the opportunity of examining specimens from Lapland. Now, having specimens before me which, in all probability, are identical with the species described by Linnæus and Nilsson, I see

* Including the rudimentary rays in front of the fin.

† Proc. Zool. Soc. 1862, p. 39.

that I have misunderstood a part of the description of the former, and that the latter has given his notes from young specimens. When Linnæus says that the head of his specimen (12 inches long) was 1½ inch, he measured only the top of the head from the end of the snout to the occiput; whilst ichthyologists of the present time take the lateral length of the head from the end of the snout to the gill-opening. Nilsson says that *S. alpinus* has shorter pectoral fins than *S. salvelinus*; this is correct if we examine specimens of the former only 8–10 inches long, but in a mature state *S. alpinus* has the longer pectorals. Therefore the characters by which I have formerly distinguished the *S. alpinus* from *S. willughbii* and *S. cambricus* cannot be retained, whilst others, affording easy specific distinctions, become evident on comparison of actual specimens. The two British species mentioned have a less number of transverse series of scales; *S. willughbii*, besides, has the body more elevated, whilst *S. cambricus* has a longer head, and the base of the pectoral overlapped by the gill-cover apparatus. The Iceland Charr, again, differs from *S. alpinus* in its elevated dorsal fin.

I have mentioned above that I refer to this species a number of specimens from Lapland, Scotland, and from the Orkneys. After having hesitated for a long time, I prefer doing so, as they certainly are more closely allied to one another than to any of the other forms. Future observations on a more perfect series than that which I have at present, and especially an examination of a greater number of immature and of very old specimens, will settle this point. The specimens from Scotland and Lapland appear to agree in almost every point of importance, but in the number of vertebræ and in the size: whilst the Lap Charr does not attain to maturity before it has attained to a length of 12–13 inches, the Scotch individuals are mature at a size of 9 inches. The specimens from the Orkney Islands are 6 inches long, and apparently correspond in age to a Lap specimen of 10 inches in length. The immature state of *S. alpinus* of both countries is distinguished by short pectoral fins; but, whilst those fins have attained to their full relative length in Scotch specimens of 9 inches in length, the Lap specimens are 13 inches long at the same period. Other differences may be observed on comparing these young Charrs, especially in the form of the head, which is considerably less elongate in the Scotch individuals; but in order to ascertain whether this character is constant, it would be necessary to compare a greater number of specimens than I have at present.

I shall first describe one of the mature specimens sent by Mr. Wheelwright from Quickjock.

Description of a male specimen, length 13 *inches* 8 *lines.*—Head and body compressed, but slightly elevated; its greatest depth is below the origin of the dorsal fin, where it is *one-fifth* of the total length (to the end of the middle caudal rays). The least depth of the tail is rather less than the length of the base of the dorsal fin. The height of the head above the mandibulary joint equals the distance between the posterior margin of the orbit and the end of the operculum. The top of the profile of the head is somewhat elevated

above the margin of the orbit, the diameter of which is nearly one-sixth of the length of the head, two-thirds of the extent of the snout, and rather less than one-half of the width of the interorbital space; the latter is convex, with a rather prominent ridge along the middle, and with a pair of series of pores. Snout compressed, conical, with the jaws equal anteriorly. The *maxillary* extends to the vertical from the hind margin of the orbit; in the two largest specimens (15–17 inches long) it reaches slightly beyond that vertical. It is armed with 20–22 *teeth* of moderate size; six teeth in each intermaxillary, fifteen in each mandible; three pairs on the vomer, arranged in two longitudinal series slightly converging behind; nineteen on each palatine bone, and six pairs on the tongue. *Operculum* obtusely rounded behind, its length being two-thirds of its height; the suboperculum projects but little beyond the hind margin of the opercle, its vertical width being one-half of that of the operculum.

D. 13. A. 12. P. 13. V. 10.

The origin of the dorsal fin is a little nearer to the end of the snout than to the root of the caudal; *the length of its base is one-third more than that of its last ray, and contained once and a fourth in that of the fourth ray.* The fifth and sixth rays form an acute point, and the upper margin of the fin is straight. The first ray is rudimentary, the second half the length of the third, the third two-fifths the length of the fourth, the fifth simple, the sixth branched, the last split to the base. The distance of the adipous fin from the dorsal is but little more than twice the base of the latter.

The origin of the anal fin is exactly in the middle between the root of the caudal and that of the outer ventral ray; the length of its base is somewhat less than that of the dorsal, and is contained once and a fourth in the length of the fifth ray.

Caudal fin forked, one of the middle rays being two-fifths as long as the outer ones, the length of which is contained six times and a half in the total; lobes pointed.

The base of the pectoral is entirely free, and not overlapped by the gill-cover apparatus; *it terminates at a considerable distance from the vertical from the origin of the dorsal,* equals the length of the head without snout, *and is contained once and a third in the distance between its root and that of the ventral.*

The ventral is inserted below the middle of the dorsal.

A specimen, 12 *inches long,* from the same locality, agrees very well with the one first described; its operculum, however, is as long as high, and the length of the pectoral fin is nearly one-half of the distance between its root and that of the ventral.

An immature specimen, 10 *inches long,* differs widely from the preceding, its body and its head being much more elongate. The length of the head is more than the height of the body, the former being one-fifth, the latter one-sixth of the total length; the operculum is longer than high, and the height of the head above the mandibulary joint is less than the distance between the posterior margin of the orbit and the end of the operculum; the maxillary ex-

tends nearly to the vertical from the hind margin of the orbit. The length of the pectoral fin is considerably less than one-half of the distance between its root and that of the ventral.

With regard to the coloration, this species does not differ from *S. willughbii*; the immature specimen has the sides silvery, and the red of the lower parts is replaced by a slight tinge of orange-colour.

Some of the specimens from Quickjock had the stomach filled with food, which consisted of specimens of small species of *Planorbis* and *Limnæa*, of *Ephemerides*, of the larvæ of *Libellula*, and of small fresh-water Crustacea. The number of pyloric appendages is forty-four.

The largest of our *Scotch* specimens is a mature male 11 inches long. It differs from the male from Quickjock in having a more elongate body, the depth of which is one-sixth of the total length. The operculum is as high as long; the pectoral fin terminates at a considerable distance from the vertical from the origin of the dorsal, equals the length of the head without snout, and is contained once and a quarter in the distance between its root and that of the ventral. The *females* do not differ from the males. The *immature specimens* have the same short pectorals which we have found in the young Lap Charr; but the operculum is much less elongate.

The stomach of the Orkney Charr contained large common earthworms (*Lumbricus*).

We distinguish, therefore, one of the Scotch Charrs by the name of *Salmo alpinus*, which, although not entirely agreeing with a Charr from Lapland described by Linnæus under the same denomination, is nevertheless closely allied to it,—the Scotch variety being considerably smaller in size at the period of first maturity. This Scotch species is found in Lake Helier in Hoy, Orkneys, and very probably in certain other lochs of Scotland*.

c. *Salmo willughbii*.

This species has been described and figured in the former paper as the Charr of Windermere. A Charr for the knowledge of which I am indebted to Lord Lovat is very closely allied to it. It is found in Loch Bruiach (North Scotland); all the specimens sent are of nearly equal length, of between 7 and 8 inches; nevertheless they are mature, and the development of the milt and ova indicates that their spawning-season is the end of October. Lord Lovat writes that "those specimens are smaller in size than usual; but they are the largest we have caught this season."

This Charr of Loch Bruiach differs but slightly from the typical *S. willughbii*; it is somewhat more elongate; it has thirteen dorsal rays, the base of the dorsal fin being rather longer than the last dorsal ray. The number of vertebræ is sixty or sixty-one, and that of the pyloric appendages is thirty-five.

* The specimens purchased of Mr. Stevens for the collection of the British Museum are from Scotland; but the exact locality whence they have been procured is unknown.

d. *Salmo nivalis. Iceland Charr.* (Pl. I.)

In the original description of *S. willughbii* (p. 48) I mentioned several specimens of a Charr from Iceland, which were not fit for an accurate examination, owing to the manner in which they had been preserved. Meanwhile I have received from Mr. G. G. Fowler two very fine examples of the same species, which, although young (10 inches long), prove that it is distinct from the other European Charrs. It is probably identical with the dark variety of *S. alpinus*, mentioned by Faber (Fische Islands, p. 169), for which he proposed the name of *S. nivalis*, if some future ichthyologist should point out its distinctive characters.

Diagnosis.—Body slightly compressed and elongate; its greatest depth equals the length of the head, and is one-fifth, or somewhat less than one-fifth, of the total length; the length of the head is rather more than one-half of the distance between the snout and the vertical from the origin of the dorsal fin. The maxillary extends beyond the orbit in the adult fish (15–20 inches long). The eye is less than one-half of the interorbital space in the adult fish. The length of the pectoral fin is, in mature and immature specimens, more, or much more, than one-half of the distance of its base from the root of the ventral. Dorsal rays fourteen; the length of the longest ray equals that of the pectoral, or that of the head without the snout; the length of the last ray is two-thirds of the length of the base. 190 transverse series of scales above the lateral line. Vertebræ 62. Teeth of moderate size.

Pyloric appendages 41. Specimens from 10–12 inches long are still immature. The stomach of one contained numerous very small freshwater bivalves.

e. *Salmo grayii.*

The Earl of Enniskillen has sent several very fine specimens of this species from Lough Melvin for the collection of the British Museum; they were all males, and perfectly like, even in size, those from which I have taken my description. A few of them showed the red of the belly of a deeper hue than the individual figured. A female fish, however, has been discovered among a collection of *Salmonidæ* purchased of Mr. Stevens: this specimen does not differ from the males; but the colours have disappeared, the specimen being preserved in spirits. The eggs are of the size of a hemp-seed.

The number of pyloric appendages is thirty-seven; and that of the gill-rakers of the lower branch of the outer branchial arch varies from nine to thirteen.

f. *Salmo colii*, n. sp. *The Charr of Lough Eske.* (Pl. II.)

In the former paper on Charrs (p. 53), I mentioned several Irish specimens, the property of the Museum at Belfast, said to be *perhaps* from Lough Melvin. I then doubted the accuracy of the "habitat," as those specimens, although allied to the Charr of Lough Melvin, differed in several not unimportant points from the types, and as they evidently belong to a very small species which is mature at a

size of 5 inches. Owing to the kind assistance of the Earl of Enniskillen and of Th. Brooke, Esq., I have been able not only to ascertain the exact locality where those specimens are found, but also to determine the characters of this new species (for such has the Charr of Lough Eske proved to be); and I name it after that nobleman, who has taken untiring interest in these researches.

Salmo colii is not confined to Lough Eske; a specimen procured by R. H. Scott, Esq., from Lough Dan, agrees in every respect with the Charr of Lough Eske. The following description, given strictly in accordance with that of *Salmo grayii*, will show the distinctive characters on which this species is founded:—

Body slightly compressed and rather elongate, its greatest depth being contained four times and three-fifths or five times in the distance of the snout from the end of the middle caudal rays. The length of the head is one-half of the distance between the snout and the vertical from the origin of the dorsal fin. Head compressed; interorbital space nearly flat, its width being less than twice the diameter of the eye. Jaws of the male of equal length anteriorly; *teeth very small*, four to six in each intermaxillary, fourteen to seventeen in each maxillary. Pectoral shorter than the head, terminating at a considerable distance from the origin of the dorsal and of the ventral. Dorsal rays fourteen. 160 transverse series of scales above the lateral line.

Description of a male and female specimen, $7\frac{3}{4}$ inches long.—Head and body slightly compressed, not elevated, the greatest depth being below the origin of the dorsal fin, where it is contained four times and three-fifths (female) or five times (male) in the total length (to the end of the middle caudal rays). The least depth of the tail is considerably less than the length of the base of the dorsal fin. The height of the head above the mandibulary joint is more than the distance between the posterior margin of the orbit and the end of the operculum. The top of the profile of the head is scarcely elevated above the margin of the orbit, the diameter of which is one-fifth of the length of the head, somewhat shorter than the snout, and two-thirds of the width of the interorbital space; the latter is but very slightly convex, with a very indistinct ridge along the middle. The nostrils are situated midway between the end of the snout and the orbit. The maxillary extends scarcely to the vertical from the posterior margin of the orbit, and is armed with from thirteen to seventeen very small teeth. All the other teeth are small; four to six in the intermaxillary, fifteen in each mandible, three on the vomer, fifteen on each palatine, and four pairs on the tongue. The suboperculum forms the hindmost part of the gill-covers, and does not cover the exposed portion of the humerus above the root of the pectoral; its vertical width is one-half of that of the operculum.

D. 14. A. 12. P. 13. V. 9.

The origin of the dorsal fin is a little nearer to the end of the snout than to the root of the caudal; the length of its base is considerably more than that of the last ray, and contained once and a

third in that of the fourth ray; the upper margin of the fin is straight. The first ray is nearly half as long as the second, the second and third half as long as the third and fourth; the fifth, sixth, and seventh are the longest, the former simple, and the two latter branched; the last is split to the base, and half as long as the sixth. The distance of the adipous fin from the dorsal is equal to, or rather less than, twice the length of the base of the latter.

The origin of the anal fin is in the middle between the root of the caudal and that of the outer ventral ray; the length of its base is less than that of the dorsal and two-thirds of the length of the fifth ray. The fourth, fifth, and sixth rays are the longest, and form an acute point; the lower margin of the fin is slightly emarginate. The fourth ray is simple, the fifth branched; the last is split to the base, half as long as the fourth.

Caudal fin forked, one of the middle rays being two-fifths as long as the outer ones, the length of which is less than one-fifth of the total. Lobes pointed.

The base of the pectoral is entirely free, and not overlapped by the gill-cover apparatus; it is shorter than the head, terminating at a considerable distance from the vertical from the origin of the dorsal; its length is one-half, or not much more than one-half, of the distance between its root and that of the ventral.

The ventral is inserted below the tenth and eleventh dorsal rays, its length being four-fifths of that of the pectoral, and two-thirds of that of the head.

Back bluish black; sides silvery, with scattered light salmon-coloured dots; belly reddish; fins black, the anal and the paired fins with a reddish tinge, the anal and the ventrals with a narrow whitish margin.

Number of vertebræ 63.

This is evidently one of the smallest species of this genus; it is mature when it has grown to a size of 5–6 inches, and, according to inquiries made by the Earl of Enniskillen, it never exceeds the length of the specimens described, viz. 7–8 inches. The locality where it is found is Lough Eske, a small lake in the county of Donegal, the circumference of which is not above eight miles. Mr. Brooke, whose family were residents on the shores of that lake for more than two centuries, writes that "Lough Eske (Eske, or Yesk, meaning Fish) was the crater of an extinct volcano, as suggested by Dr. Wilde, of Dublin; a high mountain-range runs close to the north-east shores. In the season, salmon, white trout, and the common lake-trout are in abundance. The Commissioners of Fisheries have decided that the Charr of Lough Eske are the *Salmo alpinus*, thus placing them in the same Act as salmon; so that, except for scientific purposes, we are not permitted to take them after August. Formerly, in the months of October and November the fish were taken in large quantities by the country-people, without any apparent diminution of their numbers. Now, at the permitted season of fishing they remain in such deep waters, the people have not nets sufficiently large to take them. The Charr are not at all like the only 'freshwater Herring' with which

I am acquainted, that of Lough Neagh*, the flesh of which is quite white; and the shape of the fish was like Sea-Herring."

Conclusion.

When we recapitulate the results of our examinations contained in this and in the preceding papers, we hope we have shown—

1. That three very distinct species of Charrs are found in Great Britain, namely, *S. willughbii* in the Lake of Windermere and in Loch Bruiach, *S. cambricus* in Wales, and *S. alpinus* in certain parts of Scotland.

2. That those three species differ by most constant characters from the *S. umbla* and *S. salvelinus* of the Continent; but that *S. alpinus* of Scotland is closely related to the *S. alpinus* of Lapland, differing merely by its smaller size when first attaining to maturity, and by the number of vertebræ.

3. That Iceland is inhabited by a distinct species (*S. nivalis*).

4. That the Charrs of Ireland form a separate group by themselves, distinguished by the feeble development of their dentition; and that the Charr of Lough Melvin (*S. grayi*) is a distinct species from that of Lough Eske and Lough Dan (*S. colii*).

In conclusion, I subjoin a synopsis of the species which I have examined up to the present time, observing, however, that this synopsis is given merely for the purpose of showing *a few* of the principal characters by which the *mature* individuals of the different species are distinguished:—

I. *Jaws well developed; teeth of moderate size.*

A. The length of the pectoral fin in the mature fish less than one-half of the distance between the roots of the pectoral and ventral fins.

1. Thirteen dorsal rays. Intermaxillary teeth much stronger than those of the maxillary. L. lat. 185. Lower parts silvery. *S. umbla.*
2. Fourteen dorsal rays; intermaxillary and maxillary teeth equal in strength. L. lat. 190. Lower parts red. *S. salvelinus.*

B. The length of the pectoral fin in the mature fish more than, or equal to, one-half of the distance between the roots of the pectoral and ventral fins.

1. The height of the body one-fifth or one-sixth of the total length; the height of the dorsal fin three-fifths or one-half of the length of the head. L. lat. 195–200. *S. alpinus.*
2. The height of the body one-fifth of the total length; the height of the dorsal fin equals the length of the head without snout. L. lat. 190. The gill-cover not overlapping the root of the pectoral. *S. nivalis.*

* Mr. Brooke evidently alludes here to the *Coregonus pollan.*

3. The height of the body one-fifth or one-sixth of the total length; the height of the dorsal fin two-thirds of the length of the head. L. lat. 170. The gill-cover overlapping the root of the pectoral. *S. cambricus.*
4. The height of the body one-fourth of the total length; the height of the dorsal fin equals the length of the head without snout. L. lat. 165. The gill-cover not overlapping the root of the pectoral. *S. willughbii.*

II. *Lower jaw very feeble; teeth minute.*

1. The pectoral extending to, or beyond, the origin of the dorsal fin. *S. grayi.*
2. The pectoral terminating at a considerable distance from the origin of the dorsal fin. *S. colii.*

2. On Atheris burtonii, a New Snake from West Africa. By Dr. Albert Günther.

(Plate III.)

A collection made by Major Burton, H. M. Consul in Fernando Po, during an excursion in the Camaroon country, contained several species of Snakes, namely, *Grayia triangularis*, *Dryiophis kirtlandii*, a brood of newly-born *Clotho nasicornis**, and, finally, a specimen of a Snake distinguished by its form, scales, and shields, and by a coloration which is almost unique in the whole order of Ophidians. I had named this genus *Pœcilostolus* (Ann. & Mag. Nat. Hist. Jan. 1863); but having since received the last part of 'Proc. Acad. Nat. Sc. Philad. 1862, I find that Mr. Cope has already proposed the generic name of *Atheris* for congeners of our species (p. 337).

Atheris.

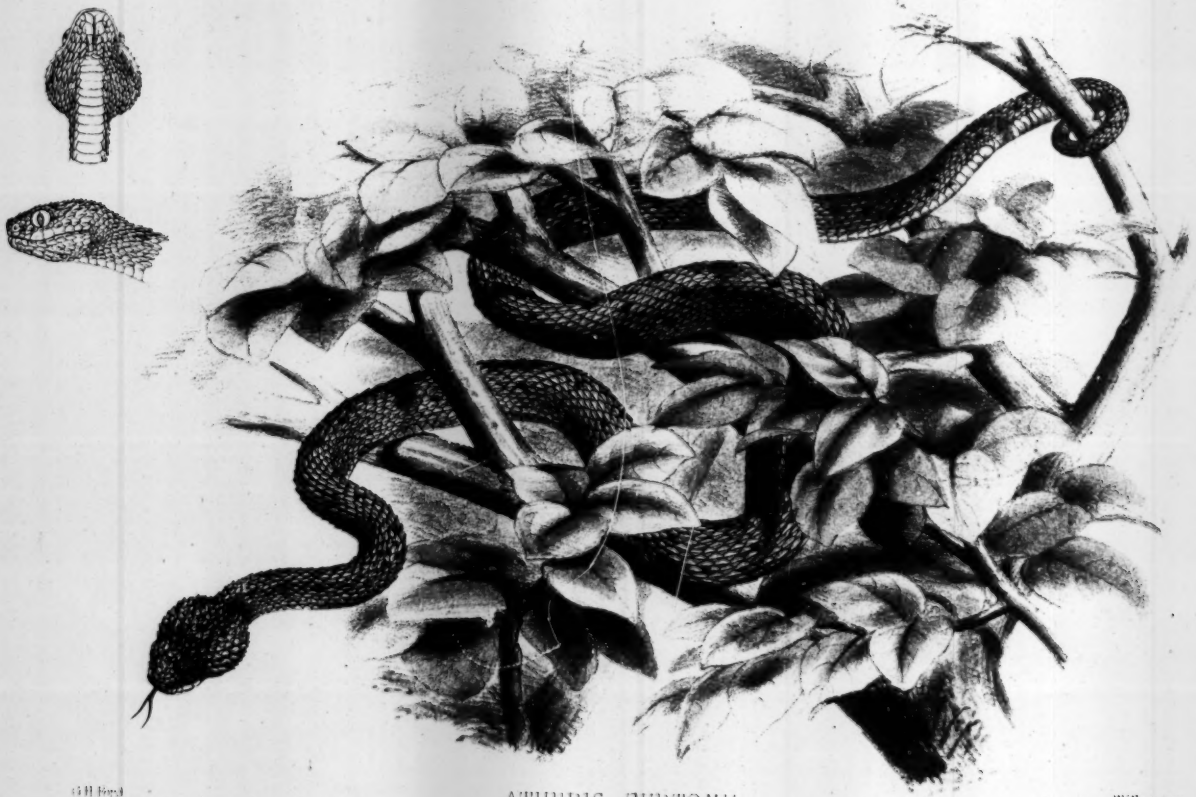
Head thick, broad, triangular, covered above with strongly-keeled scales; body compressed; tail prehensile. Scales keeled. Subcaudal shields entire.

Atheris burtonii. (Pl. III.)

The head and neck are rough, in consequence of the keels of the single scales forming prominent spines. The rostral shield is very low, linear, with other scale-like shields above; nine upper labials. Nostril in the middle of a single subquadrangular plate, situated above the first labial; eye surrounded by a ring of subequal scales; chin-shields scale-like, keeled, except the anterior pair, which are smooth; the posterior labial shields of the lower jaw keeled. Scales

* There is also a specimen, in a very bad state of preservation, which appears to belong to *Neusterophis lævissima* (*Natrix lævissima*, Gthr.).

P. Z. S. 1863. Plate III.



G.H.Ford

ATHERIS BURTONII.

W.West imp.

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of the body in nineteen rows. Ventral shields 163; anal entire; subcaudals 58.

Entirely lemon-coloured; some greenish scales are scattered about on the upper surface of the body.

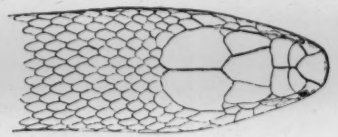
Total length 14 inches; head $\frac{2}{3}$ inch; tail $2\frac{1}{2}$ inches.

3. Note on Diemennia superciliosa. By Dr. A. Günther.

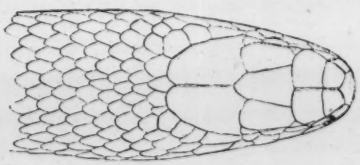
The Proceedings of this Society of last year* contain a very interesting observation of Mr. Krefft, of Sydney, according to which a small banded Snake, which he identifies with *Furina textilis*, Dum. & Bibr., is merely the young of a very large species, the adult of which is of a nearly uniform coloration. Mr. Krefft (who, for the benefit of the collection entrusted to his care, is very anxious to have his specimens identified with the types contained in European collections) has sent us an old and two young examples of this Snake; and having re-examined the species of *Diemennia* and the literature referring to them, I am enabled to settle some points on which doubts have been entertained.

The young specimens, then, found by Mr. Krefft do not belong to *Furina textilis*, Dum. & Bibr., which has three posterior oculars, but to *Diemennia annulata*, described by myself in the 'Catalogue of Colubrine Snakes,' p. 213; and the old individual sent by Mr. Krefft is identical with *Pseudoëlaps superciliosus*, Fisch. M. Jan, of Milan (who says that he has examined the Snakes of the Hamburg Museum), describes the adult Snake under two names, *Pseudoëlaps sordellii* and *Ps. kubingii*, the latter being founded on an accidental variety, in which some of the head-shields are confluent.

Mr. Krefft, in a letter addressed to me, alludes to *Pseudonaia nuchalis* as a species which, perhaps, might be identical with an old *Diemennia superciliosa*. These, however, differ *toto cœlo*, as may



a.



b.

* Proc. Zool. Soc. 1862, p. 149.

be seen from the description given by myself (Colubr. Sn. p. 227), and from the figures (*anteà*, p. 17), where fig. *a* represents the head-shields of *Pseudonaia nuchalis*, and fig. *b* those of *Diemennia superciliosa*.

The synonymy of this species, therefore, would be :—

DIEMENNIA SUPERCILIOSA.

a. *Adult*.

1856. *Pseudoëlaps superciliosus*, Fischer in Abhandl. Geb. Naturwiss. iii. p. 107, taf. 2. fig. 3 (head, not quite correct).

1859. *Pseudoëlaps sordellii*, Jan in Rev. & Mag. Zool. 1859, pl. C (head).

1859. *Pseudoëlaps kubingii*, Jan, *l. c.* (founded on an accidental variety).

b. *Young*.

1858. *Diemansia annulata*, Günth. Colubr. Snak. p. 213.

1862. *Furina textilis*, Krefft, P. Z. S. 1862, p. 149.

4. List of Birds collected in the Island of Bouru (one of the Moluccas), with Descriptions of the New Species. By Alfred R. Wallace, F.Z.S.

(Plates IV., V., VI.)

This collection of birds was made by myself during two months of the year 1861. It consists of *sixty-six* species, among which were no less than *seventeen* new ones. Of these, *three* were found about the same time in the Island of Sula, and, with a new *Pitta*, have already been described in the Society's 'Proceedings,' leaving *thirteen* to be described in the present paper.

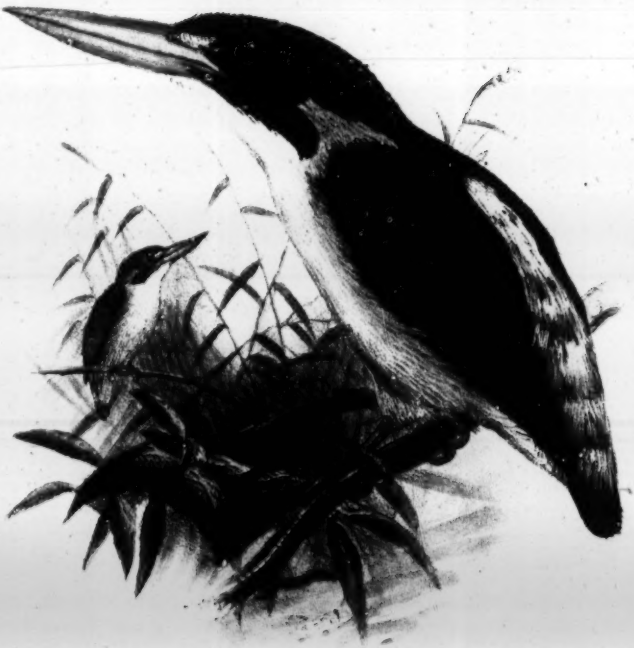
In my paper "On the Birds of the Sula Islands," read before the Society at their last Meeting, I pointed out that the large proportion of purely Celebes forms found there forced us to the conclusion that a closer connexion had once existed between those islands and Celebes, and required us to class them as forming a single zoological group. The Island of Bouru must, on the contrary, be classed with the Moluccas; for, leaving out about *twenty* species of rather wide distribution, the remaining *forty-six* are all either identical with, or most nearly allied to, Moluccan species. Not a single characteristic Celebes form is found in Bouru; and there are only *three* birds in the island whose affinities seem rather with the Indian than the Australian region, viz. *Alcedo moluccensis*, *Hirundo javanica*, and *Treron aromatica*.

Bouru is therefore the western limit of the Moluccan fauna, and is the poorest portion of it, having several very remarkable deficiencies. *Lorius*, found in every other island of the Moluccas and New Guinea, is absent; *Cacatua*, found in every island of the Australian region, is also absent; and, stranger still, *Buceros* and *Corvus*, found in almost every large island of the archipelago, are both wanting.



FALCO RUBRICOLLIS.

BRITISH
3 AU 60
MUSEUM



BRITISH
3 AU 64
MUSEUM



J. Wolf del. et lith.

P. Z. S. 1868, Pl. .



... et Pub.

M & N Hanhart imp.

NOTHOCHA TORQUATA.

BRITISH
3 AU 64
MUSEUM

With these exceptions, most of the Moluccan types are represented either by identical or allied species.

The following is a list of the new species now described, and of a few others which seem confined to Bouru:—

Tanygnathus affinis, n. s., Bouru and Ceram.
Accipiter rubricollis, n. s., Bouru and Ceram.
Athene hantu, n. s.
Tanysiptera acis, n. s.
Ceyx cajeli, n. s.
Pitta rubrinucha, Wallace.
Cisticola rustica, n. s.
Mimeta bouruensis (H. & J.).
Criniger mysticalis, n. s.
Monarcha loricata, n. s.
Rhipidura bouruensis, n. s.
Tropidorhynchus bouruensis, n. s.
Campephaga marginata, n. s.
Dicæum erythrothorax, Less.
Nectarinea proserpina, n. s.
Gallinula frontata, n. s.

All but the two first species in this list are confined to Bouru only, and they are mostly representative species of Moluccan forms. Besides these, the three species of *Pachycephala* are also, as far as the Moluccas are concerned, peculiar to Bouru; for though they are found also in Sula, they have evidently emigrated there, the Celebes group, to which Sula belongs, not possessing any species of the genus. The Island of Bouru may therefore be considered to have added *seventeen* new species, but not any new forms or genera, to the Moluccan avifauna.

GEOFFROIUS PERSONATUS.

Psittacus personatus, Shaw.
P. bataviensis, Wagl. Mon. Psitt. p. 624.
Hab. Bouru, Amboyna, Ceram, Goram, Ké and Aru Islands.
Remarks.—The specimens from Bouru, and some from Ceram, are 12½ inches long; that from the Aru Islands 9 inches; but I have a series of intermediate sizes, and can discover no differences of form or in the distribution of the colours. I must therefore consider Mr. G. R. Gray's *Psittacus aruensis* (P. Z. S. 1858, p. 183) as only a small variety of this species, and his *P. capistratus*, from the Ké Islands (*ibid.* p. 183), as a young male bird of the same species.

ECLECTUS MAGNUS.

Psittacus magnus, Gm. S. N. i. p. 344.
Hab. Bouru and the other islands of the Moluccas and New Guinea.

ECLECTUS PUNICEUS.

Psittacus puniceus, Gm.? (et auct.) Pl. Enl. 518.
Hab. Bouru, Amboyna, and Ceram.
Remarks.—This bird is sufficiently distinct from the *Psittacus grandis*, Gm., which is confined to the Gilolo group, in its smaller size, duller red colour, red under tail-coverts, and tail only orange-tipped, in place of the yellow under tail-coverts and larger yellow tail-band of *E. grandis*. Great confusion exists in the synonymy of the *Psittaci*, owing, I believe, to the fact of so many of these birds

having been described from specimens which have lived a long time in confinement, and have acquired abnormal colours in various parts of their plumage. The production of such coloured variations is, in fact, an art practised by the native tribes both in South America and in the Eastern Islands. Another cause of error is from young birds having been described; and a third, from the deficiencies of badly prepared native skins having been made up by the addition of parts (often the wings and tail) of other birds. In the present case I have little doubt that this bird is the *P. puniceus* of Gmelin, and the *Lorius amboinensis* of Brisson, whose description, generally so eminently accurate, appears to apply to a young bird which had lost its primary quills. I cannot agree to the revolution in nomenclature proposed by Mr. G. R. Gray, in using the names of Boddaert, which have been considered of no authority by every other author from the time of Gmelin to that of Prince Bonaparte.

TANYGNATHUS AFFINIS.

Viridis, subtus flavescens; capite saturate viridi; dorsi plumis cæruleo marginatis; crisso cæruleo; tectricibus alarum minoribus et mediis obscure viridibus, flavo marginatis, versus marginem et flexuram alarum viridi-cæruleis; majoribus cæruleo-viridibus, flavo-viridi marginatis; cauda subtus lutescente; culmine rostri versus basin biangulato.

Near *T. macrorhynchus*, Wagl.; but the under surface, and especially the sides of the breast and belly, have much less yellow; the shoulders and wing-coverts are dull greenish and blue instead of deep black, and only a few of the lesser wing-coverts are of a greenish black; the greater wing-coverts nearest the body are all green, and the yellow margins are much less conspicuous than in the allied species; the outer webs of the primaries and of the greater and middle wing-coverts are green, instead of blue as in *T. macrorhynchus*. The bill also differs, the culmen being much flattened in its basal half, with distinct angular edges, whereas in the allied species it is regularly rounded. Bill deep red; feet dusky olive; iris olive-yellow, with an outer ring nearly white.

Total length 17 inches; wing 9½ inches; bill, to base, ♂ 2⅛ inches, ♀ 1⅞ inch.

Hab. Bouru, Amboyna, and Ceram.

Remarks.—The Amboyna and Ceram specimens have the wing-coverts a little darker than those from Bouru, but they are still sufficiently distinct from *T. macrorhynchus*.

TRICHOGLOSSUS CYANOGRAMMUS.

T. cyanogrammus, Wagl. Mon. Psitt. p. 554.

T. nigrogularis, G. R. Gray, P. Z. S. 1858, p. 183.

Hab. Bouru, Ceram, and all the Papuan Islands.

Remarks.—On examining specimens from the above-mentioned localities, I can find only slight individual variations among them, not confined to any given locality. The specimens from the Aru Islands (*T. nigrogularis*, G. R. Gray) exactly agree with the rest.

EOS RUBRA, var.

Psittacus borneus, L.
P. ruber, Gm., Wagl. Mon. Psitt. p. 558.
Hab. Bouru, Amboyna, Ceram, and Matabello Islands.

The specimens are rather smaller than those from Amboyna, and have more blue on the wing-coverts, and often a greenish tinge on the wings and tail, which makes them agree with the descriptions of *P. borneus* of the old authors. Might not Bouru have been mistaken for Borneo, and thus led to the erroneous name?

Note.—Besides the preceding five species of *Psittaci*, Bouru possesses also the *Aprosmictus amboinensis*; but as a specimen was not obtained by me, I have not included it in the present list.

HALIASTUR LEUCOSTERNUS.

Haliastur leucosternus, Gould, B. of Austr. i. pl. 4.
Hab. Bouru and the countries eastward.

BAZA REINWARDTII.

Lophotes reinwardtii, Schleg. & Müll. Verh. Ned. t. 5.
Hab. Bouru, the Moluccas, and Timor.

ACCIPITER RUBRICOLLIS. (Pl. IV.)

Supra nigro-plumbeus, subtus albo-cinereus; nucha et colli lateribus late et intense rufis; genis cinereo-plumbeis; gula ventreque albescentibus; remigibus rectricibusque obscure fasciatis.

Above slaty black; beneath very pale ash, shading into nearly pure white on the throat, belly, and under tail-coverts. Back and sides of the neck extending between the shoulders deep red-brown, a lighter shade of which covers the sides of the breast; the wings and tail are crossed by obscure black bands, which on the lighter undersides of the feathers become distinct blackish bands, less visible on the outer tail-feathers. The under wing-coverts and the base and margins of all the quills beneath are of a light rufous-buff. Bill black, at the base plumbeous; cere, orbits, and feet yellow; iris golden yellow.

Length 14 inches; wing $8\frac{1}{4}$ inches; tail $6\frac{1}{4}$ inches; tarsus $2\frac{1}{8}$ inches; middle toe and claw $2\frac{1}{8}$ inches.

The young bird is dusky above, with the feathers rufous-margined; beneath creamy white, with broad dusky stripes down each feather.

Hab. Bouru, Ceram, and Gilolo.

Remark.—This bird resembles on its upper surface *A. erythrauchen*, G. R. Gray (P. Z. S. 1860, p. 344), but is very much larger. As the dimensions of that bird are wrongly printed, I will here correct them. Instead of "length 11′ 9″, wing 8′ 9″," as given, it should be, "length 10′ 9″, wing 6′ 9″"*.

* Since reading this paper, I have seen Professor Schlegel's 'Catalogue of the Birds in the Leyden Museum,' part 1, in which (Astures, p. 39) he describes this bird under the name of *Nisus cirrhocephalus ceramensis*, which seems to be equivalent to making it a variety of *N. cirrhocephalus*. Considering, however, the

ACCIPITER CRUENTUS.

Astur cruentus, Gould, Birds of Austr. i. pl. 18.
Hab. Bouru and Timor.

ATHENE HANTU.

Rufa, supra rufo-brunnea; gula pallidiore; fronte genisque albescentibus; corpore subtus, cum cauda, rufescente et albescente indistinctissime fasciato; tectricibus alarum inferioribus rufis; remigibus fuscis, pogonio externo rufo; digitis tarsisque setulosis.

Above dark, beneath bright rufous; tail with very indistinct, narrow, paler bars; forehead, cheeks, and chin whitish; under surface indistinctly banded with narrow fasciæ of darker and lighter rufous or whitish; the under tail-coverts barred with rufous and whitish; quills not barred, except close to their bases; under wing-coverts rufous, not barred; third, fourth, and fifth quills equal; tarsi and toes densely clothed with bristles; bill whitish horn-colour; iris yellow; feet (in the living bird) white.

Length 12 inches; wing $8\frac{3}{4}$ inches; tail 5 inches.

This species resembles *A. squamipila*, Bp., in its hairy tarsi, but differs in its coloration and proportions; it is one of the "burong hantus" (ghost-birds) of the natives.

Hab. Bouru.

SCOPS LEUCOSPILUS.

Ephialtes leucospila, G. R. Gray, P. Z. S. 1860, p. 344.
Hab. Bouru and Gilolo.

CAPRIMULGUS MACROURUS.

C. macrourus, Horsf. Linn. Trans. xiii. p. 142.
Hab. Bouru and the whole archipelago.

DENDROCHELIDON MYSTACEUS.

Cypselus mystaceus, Less. Voy. Coquille, Ois. t. 22.
Hab. Bouru, Moluccas, and New Guinea.

Remark.—This is the limit of the range of this fine Tree-Swift to the westward. In the Sula Islands and Celebes it is replaced by *D. wallacii*, Gould.

CACOMANTIS ASSIMILIS.

Cuculus assimilis, G. R. Gray, P. Z. S. 1858, p. 184.
Hab. Bouru.

This specimen seems to agree with that named and described as

bird to be a very good species, I should at once have adopted Professor Schlegel's name *ceramensis*, had I not obtained the bird in other localities than Ceram. The *Raptores* having so generally an extensive range renders the application of territorial specific names less advisable in their case than in that of the *Passeres*. My own rule is only to apply the name of a country as specific name when the surrounding districts are known to possess their peculiar representative species, in which case it amounts almost to a certainty that the new bird is similarly restricted in range.

above; but these small Cuckoos vary so much in their plumage as to render it very difficult to decide. My specimens seem to show that the same species extends over Celebes, the Moluccas, and New Guinea; and it may be probably the same as *C. tymbonomus*, Müll.

EUDYNAMIS RANSOMI.

E. ransomi, Bp. Consp. Gen. Av. p. 101.

Mas ad. *nigro-violaceo nitens; rostro pallide viridi-olivaceo; pedibus plumbeis.*

The female and young male were described by Bonaparte. The adult male is, like others of the genus, entirely shining blue-black; iris crimson.

Total length 18–19 inches; wing 8–8½ inches; bill, to front, 1⅛ inch.

Hab. Bouru and Ceram.

CENTROPUS MEDIUS.

C. medius, Bp. Consp. Gen. Av. p. 108.

Bill black; feet blackish lead; iris olive-brown. In the immature bird the plumage above is pale rufous, banded and spotted with black; the tail bronzy black, with about sixteen rufous bands; the under surface yellowish, with small dark spots; the thighs and vent dusky; and the bill pale horn.

Length 18–19 inches; wing 7½–8 inches; bill, from gape, 1½ inch.

Hab. Bouru, Ceram, and Gilolo.

TODIRAMPHUS COLLARIS.

Alcedo collaris, Scop.; Sw. Zool. Ill. t. 57.

Hab. Bouru and the whole archipelago.

TODIRAMPHUS SANCTUS.

Halcyon sancta, Vig. & Horsf.; Gould, Birds of Austr. ii. pl. 21.

Hab. Bouru and the islands eastward.

TANYSIPTERA ACIS.

Supra nigra, subtus albo-rufescens, plumis tenuiter nigro marginatis; plumis pilei cæruleo marginatis, superciliis et corona occipitali magis cæruleis; tectricibus alarum minoribus cæruleis; uropygio albo; tectricibus caudæ superioribus albis, rufo tinctis et nigro marginatis; rectricibus mediis elongatis cæruleis, ad basin fusco et albo maculatis, spatulis albis cæruleo marginatis; aliis albis, externe fusco-cæruleo marginatis, interne albo et nigro maculatis; gula albescente; tectricibus caudæ inferioribus albis.

Forehead and crown black, with the feathers blue-margined; a band over the eyes and round the nape brighter blue; ear-coverts, back, and wings deep black, with the lesser wing-coverts blue-margined, margin of the wing blue-tinged; primaries with the outer webs pale-edged towards the tips; under surface of the body pale

buff, nearly white on the throat; the feathers of the breast and flanks with blackish lateral edges; rump white, feathers black-edged, the black increasing to the tail-coverts, the last of which have the outer web black; middle tail-feathers blue, with the bases irregularly white-striped, and the spatulate ends white, with bluish margins; lateral tail-feathers white, with blue margins to the outer webs, and irregular dusky markings on the inner webs. Bill orange-red; feet olive; iris dark.

Total length 14½ inches; wing 4 inches.

Hab. Bouru.

Remarks.—This interesting addition to the genus *Tanysiptera* is blacker on the upper surface than any of its allies. It is also remarkable for the buffy tint and black-edged feathers of the under surface,—characters which in the other species are confined to the young birds. My specimen is, however, in fine plumage and condition, and I have little doubt that these characters are distinctive of the adult bird.

Nine species of the genus have now been described; and a careful examination of the fine series of specimens in my collection having convinced me that they can all be clearly characterized, I will add a table of the species.

Table of the Species of Tanysiptera.

	Species.	Habitats.
I. With a white dorsal spot.		
1. Beneath cinnamon-red	1. *sylvia*	N. Australia.
2. Beneath white.		
A. Tail and upper tail-coverts blue-margined	2. *doris*	Morty Island.
B. Tail and upper tail-coverts white	3. *sabrina*	Kaioa Island.
II. No dorsal spot.		
1. Rump red	4. *nympha*	New Guinea.
2. Rump white.		
A. Ear-coverts and nape black.		
a. Outer tail-feathers black, blue-edged	5. *hydrocharis*	Aru Island.
b. Outer tail-feathers white, blue-edged	6. *acis*	Bouru.
B. Ear-coverts and nape dark blue.		
a. Eyebrows and nape lighter blue than the crown, terminal tail-coverts black	7. *isis*	Batchian and Gilolo.
b. Head uniform blue, tail-coverts all white.		
a. Back blue-spotted	8. *nais*	Amboyna, Ceram.
b. Back uniform	9. *galatea*	New Guinea and Waigiou.

In this table I have altogether left out the Linnæan *Alcedo dea*, because it is possible we may yet obtain certain evidence as to which species it was applied to. The figure in the 'Planches Enluminées' and the careful description of Brisson agree best with *T. sabrina*, G. R. Gray; and I should have little hesitation in placing that name under *T. dea* as a synonym, but that specimens may yet arrive from Ternate—the locality given by the old authors. It is to be remarked, however, that Kaioa Islands, where I obtained *T. sabrina*, is the southernmost of a chain of islets extending up to Ternate, and nowhere more than eight or nine miles apart; so that it is very improbable there should be another species in that island. There can be

therefore, I think, but little doubt that *T. sabrina* is but an individual or local variety of the true *Alcedo dea*.

ALCEDO MOLUCCENSIS.

Alcedo moluccensis, Blyth, Journ. As. Soc. Bengal, 1847.
Hab. Bouru, Celebes, and Gilolo.

CEYX CAJELI. (Pl. V.)

Nigra, subtus rufo-lutea; capite et tectricibus alarum punctis parvis cæruleis ornatis; dorso et caudæ tectricibus pallide cæruleis; gula late alba; genis nigris aut tenuiter cæruleo striatis; flexura et margine alarum, colli et frontis maculis lateralibus rufis; rostro pedibusque dilute corallinis.

Above black; beneath rufous yellow; each feather on the head marked with a very small, subtriangular, light-blue spot; on the back and upper tail-coverts the outer half of each feather is whitish blue; chin and throat pure white; a frontal spot over each nostril, a patch behind the ears, and the bend and margin of the wing rufous; ear-coverts black, and the space below them either black or very finely striated with blue; bill and feet pale coral-red; iris dark.

Length 6 inches; wing $2\frac{3}{8}$ inches; bill, from front, $1\frac{3}{8}$ inch.
Hab. Bouru.

Remarks.—This species is very like *C. lepida*; but differs in the very small spots on the head and the stripe on the back being of quite a different blue colour, and also in the scapulars being entirely black, whereas in the other species they are tipped with rich blue. I have named this species after the town or fort of Cajeli in Bouru, to which island this pretty bird is most probably strictly confined.

EURYSTOMUS PACIFICUS.

Coracias pacifica, Lath.
Eurystomus australis, Gould, B. of Austr. ii. pl. 17.
Hab. Bouru and the islands eastward.

PITTA RUBRINUCHA.

Pitta rubrinucha, Wallace, P. Z. S. 1862, p. 187.
Hab. Bouru.

ACROCEPHALUS AUSTRALIS.

Acrocephalus australis, Gould, Birds of Austr. iii. t. 38.
Hab. Bouru.

Remarks.—My specimen agrees exactly with Gould's figure and description. I did not meet with the species in any other of the islands.

CISTICOLA RUSTICA.

Luteo-rufa; supra plumis medialiter nigris; subtus gula et abdomine medio albescentibus; rectricibus subtus rufo terminatis, macula subapicali nigra.

Rufous yellow; feathers of the head with a black stripe, of the

back and wing-coverts black with a rufous margin; quills dusky, the primaries narrowly, the secondaries and tertiaries more broadly rufous-margined; tail pale, rufous-tipped; the two middle feathers rufous, with the central part and towards the apex blackish, the rest black; beneath with the sides of the neck, the breast, the flanks, and the under wing-coverts and tail-coverts pale chestnut, becoming nearly pure white on the throat and the middle of the belly; quills beneath brownish black, narrowly margined with pale rufous towards the base; tail beneath dusky, the feathers with narrow margins and broader tips of pale rufous, and each with a large subapical black spot; bill dusky above, pale beneath; feet and claws pale yellowish; iris pale olive.

Total length 4 inches; wing $1\frac{7}{10}$ inch; tarsus $\frac{5}{8}$ inch.

Hab. Bouru.

Remark.—Very near *C. lineocapilla*, Gould, with which I had at first placed it; but comparison with a specimen in the British Museum has convinced me of its distinctness from any of the Australian species.

MIMETA BOURUENSIS.

Philedon bouruensis, Quoy & Gaimard, Voy. de l'Astrol. t. 8. f. 2.
Tropidorhynchus buruensis, Bp. Consp. Gen. Av. p. 390.

Cinereo-brunnea, subtus pallidior; facie et auriculis fusco-nigris; capite et gula substriatis; torque nuchali indistincto fulvo-cinereo.

Earthy brown; beneath whitish brown; head a little paler, the feathers marked with a central blackish stripe, and on the nape a narrow paler rufescent band; ear-coverts dusky black; lores and cheeks blackish, mixed with whitish; chin and sides of the throat with a dusky stripe on each feather; primaries outwardly edged with pale rufous; under wing-coverts and margins of all the quills beneath towards the base pale rufous or buff; under tail-coverts with a tinge of buff; rectrices, all but the middle pair, tipped on the inner web with the same colour; bill horny black; feet lead-colour; iris dull red.

Length 9 inches; wing $5\frac{5}{8}$ inches; tail $4\frac{3}{4}$ inches; bill, to front, $1\frac{1}{4}$ inch.

Hab. Bouru (Moluccas).

Remarks.—This curious bird resembles so closely a Honeysucker of the genus *Tropidorhynchus* that it has been figured and described as such, and even escaped the acute eye of Prince Bonaparte, who has given it that place in his 'Conspectus.' But, more singular still, there is a species of true *Tropidorhynchus* inhabiting the same island of Bouru, which so closely resembles this bird that the two can hardly be distinguished, except by a close comparison of the generic characters that separate them. We have here, in fact, a case among birds of that *mimicry* of one species by another belonging to a different group, which Mr. Bates has so well illustrated among the Lepidoptera of S. America (see Linn. Trans. vol. xxiii. p. 495). In this case the Oriole has imitated the Honeysucker; for it has de-

parted from the usual gay colouring of its allies, and is actually the dullest-coloured of its family, while the Honeysucker very much resembles in its coloration other species of the group to which it belongs. The imitation is carried to the minutest particulars: the bare black orbits of the *Tropidorhynchus* are copied by a patch of dusky feathers in the *Mimeta*; the rigid lanceolate feathers on the head of the former are imitated by dark stripes on the broader feathers of the latter; and even the very peculiar ruff of recurved feathers on the nape of the *Tropidorhynchus* has its general effect imitated by a collar of a pale colour in the *Mimeta*. The under and upper surfaces of the two birds are as near as possible of the same tint respectively; and, stranger still, the Oriole has closely copied the mode of flight and the voice of its model; so that in a state of nature the two birds are practically undistinguishable. Most of the species of *Tropidorhynchus* have an elevated keel or protuberance at the base of the bill. In the Bouru bird this is altogether wanting; yet in the *Mimeta* which copies it there is a slight protuberance at the base of the bill, which does not occur in any other species of its genus—almost making us think that some ancestors of the present bird had mimicked a species of *Tropidorhynchus* which possessed the protuberance, and that their descendant, finding himself in the company of a bird without this ornament, was gradually losing it, but had not yet quite done so. It has been observed by Mr. Bates, and is no doubt generally true, that mimicking species are much less abundant than those they copy. In the present instance it seems to be different; for I obtained many specimens of the *Mimeta* before I saw a single *Tropidorynchus*, though in other islands the latter was generally the most abundant. Perhaps in this case it has carried the imitation to such an extent as actually to gain an advantage over its model in the struggle for existence. This curious instance of mimicry does not stand alone; for in the adjacent island of Ceram, two allied but very distinct species (*Mimeta forsteni* and *Tropidorhynchus subcornutus*) resemble each other with equal accuracy. What peculiar immunity from danger the *Tropidorhynchi* possess, which makes it advantageous for other birds to imitate them, it is not very easy to see. In the case of insects, it seems probable that it is the odour or taste of the imitated species which is unpalatable to insect-eating birds; or, in other cases, like the clear-winged Moths which mimic Hymenoptera, the mimicked species are armed with a sting. In birds it is evident that the bravest, strongest, and best-armed groups should be the subjects of mimicry, and the weakest and most defenceless those which obtain some advantage by imitating them. Now this is certainly the case, for the *Raptores* are the most frequent subjects of imitation—a Parrot (*Strigops*) imitating an Owl, some Curassows of the genus *Ibycter* resembling Hawks (Ibis, vol. ii. p. 223), and Cuckoos frequently resembling Hawks. A species was named by Temminck *Falco cuculoides*; and in all parts of the world the larger grey and banded Cuckoos are mistaken by the natives for Hawks. Cuckoos, however, which are certainly among the weakest and most defenceless of birds, imitate several

other groups, especially Gallinaceæ,—for example, *Centropus phasianus* in Australia, and *Carpococcyx radiatus* in Borneo, which latter is terrestrial in its habits, and much resembles the *Euplocami* of the same island. *Eudynamis* also frequently resembles Pigeons, especially the females and young birds, which are banded like *Macropygia*. Among the small Cuculinæ some are very like *Campephagæ*; and *Chrysococcyx* has put on the metallic plumage of *Lamprotornis*.

Returning now to *Mimeta* and *Tropidorhynchus*, we have to observe that the former is a smaller, weaker, less active, less noisy, and less pugnacious bird; the feet have a less powerful grasp, and the bill is less acute. The latter has a great variety of loud and piercing notes, which bring its companions to the rescue in time of danger; and I have observed them drive away crows and even hawks which had ventured to perch on a tree where two or three of them were feeding. The *Tropidorhynchus* knows how to take care of himself, and make himself both respected and feared; it would therefore evidently be to the advantage of the more defenceless *Mimeta* to be mistaken for him.

In this instance, as in most others, the imitation is far closer in the living bird than in the dead specimens, and it is a far more satisfactory case of mimicry than any of those which I have alluded to as occurring among birds, and which are more or less general resemblances to another group; while here we have two *species*, each confined to a single island, and each accurately imitated by a bird of a distinct family, with which it has no direct affinities.

I therefore cannot doubt that this is a true case of mimicry, exactly analogous to that so common among insects, and which my friend Mr. Bates has the honour of having first brought under the same general laws which have regulated all variation in the organic world.

CRINIGER MYSTICALIS.

Viridi-olivaceus; subtus flavo-virens; gula crissoque flavescentibus; mento, loris et palpebris flavis; remigum pogonio interno fusco-nigro; cauda immaculata.

Entirely olive-green, more yellow-tinged beneath, especially on the throat and under tail-coverts; the lores, chin, and eyelids are pure yellow, and also the basal half of the gape-bristles; bill horny black; feet lead-colour; iris red.

Total length 9 inches; wing 4¼; bill to gape 1 inch.

Hab. Bouru.

Remarks.—This species is nearest to *Criniger simplex*, from Gilolo (Ibis, 1862, p. 350); but is at once distinguished by the markings of the face and the remarkable half-yellow gape-bristles.

ARTAMUS LEUCOGASTER.

Lanius leucogaster, Val. Ann. Mus. H. Nat. iv. t. 7. f. 2.

Hab. Bouru and the whole archipelago, from Sumatra to New Guinea.

Remarks.—From the large specimens of N. Celebes to the small ones of Timor and New Guinea there is such a gradation of size in

the various islands that it is impossible to separate birds which otherwise agree exactly in form and coloration. *A. papuensis*, Bp. Consp. p. 344, will have to be considered as a very slight local variety of the present bird.

HIRUNDO JAVANICA.

Hirundo javanica, Lath., Temm. Pl. Col. 83. f. 2.
Hab. Bouru and the islands westward.

MYIAGRA GALEATA.

Myiagra galeata, G. R. Gray, P. Z. S. 1860, p. 352.
Hab. Bouru and the Moluccas.
Remarks.—The only two specimens procured are ashy above, with faint signs of glossy blue and rufous white beneath; they probably show the immature plumage of the species, of which I have specimens from Ceram and the small islands east of it, and also from Morty, north of Gilolo.

MONARCHA LORICATA. (Pl. VI.)

Nigro-chalybea, subtus alba; mento gulaque squamatis, nigro-chalybeis; cauda alba, rectricibus mediis nigris, duabus utrinque juxta medium nigro terminatis; rostro pedibusque cæruleo-plumbeis.

Blue-black; beneath pure white, except the throat, which is covered with scaly feathers of a rich metallic blue-black; this colour meets the black of the upper parts at the angle of the mouth, and extends in an oval shield to the bottom of the neck; under wing-coverts white; tail with the three lateral feathers on each side entirely white, the next two black-tipped, and the middle pair entirely black, with occasionally some white touches on the outer webs; bill and feet lead-blue; iris dark.

The sexes are alike; in the young bird the white is replaced by pale reddish brown, and the black by fuscous brown.

Total length 7 inches; wing 3½ inches.

Hab. Bouru Islands (Moluccas).

Remarks.—This beautiful species is nearly allied to *M. leucura* of Mr. G. R. Gray, which I sent from the Ké Islands, east of Ceram.

RHIPIDURA TRICOLOR.

Musicapa tricolor, Vieill. N. Dict. Hist. Nat. xvi. p. 490.
Hab. Bouru, Moluccas, and New Guinea.

RHIPIDURA BOURUENSIS.

Fusco-plumbea; capite nigro, ventre pallide rufo, alis caudaque fuscis; gula albescente, pectoris maculis elongatis albis; stria supraoculari occulta, alba; tectricibus majoribus pallide terminatis, remigibus ultimis pallide marginatis; rectricum duarum externarum pogonio externo rufo-albo.

Dusky lead-colour, deepening on the head to black; wings and

tail dusky brown; feathers of the throat somewhat decomposed, with the outer half white; those of the breast with an elongate oval white spot on each feather; middle of the belly, the vent, and under tail-coverts pale rufous; over the eye is a silvery-white mark, only visible when the feathers are raised; the under wing-coverts are tipped with pale rufous, the outer row with white; the greater wing-coverts above have the extreme apex whitish, the tertiary quills have a very narrow pale-rufous edging; the tail is immaculate, with the exception of the two outer quills, which have their outer web for its whole length rusty white; bill black; feet dusky; iris dark.

Length 7 inches; wing $3\frac{3}{8}$ inches; tail $3\frac{1}{2}$ inches; bill, to front, $\frac{1}{2}$ inch.

Hab. Bouru.

Remarks.—I have named this species after the island it inhabits, because the allied forms from the surrounding islands being already known, there is every probability of its never being found anywhere else.

PACHYCEPHALA LINEOLATA.

Pachycephala lineolata, Wallace, P. Z. S. 1862, p. 341.
Hab. Bouru and Sula Islands.

PACHYCEPHALA RUFESCENS.

Pachycephala rufescens, Wallace, P. Z. S. 1862, p. 341.
Hab. Bouru and Sula Islands.

PACHYCEPHALA CLIO.

Pachycephala clio, Wallace, P. Z. S. 1862, p. 341.
Hab. Bouru and the Sula Islands.

Remarks.—The Bouru specimens have a more yellow tinge on the back, and the black pectoral band is generally broader than in those from Sula. I may here observe that the fine species from Batchian and Ternate, included in Mr. G. R. Gray's list of Molucca birds as *P. melanura*, Gould, is quite distinct from that species, and may be recognized by its black chin and upper tail-coverts, and narrow black crescent on the breast entirely disconnected from the black head, and also by its much larger size. We have therefore in the Moluccas four species of *Pachycephala* allied to the *pectoralis* and *melanura* of Australia, viz. *P. macrorhyncha*, Strickl., in Amboyna and Ceram, *P. calliope*, Bp., in Timor, *P. clio* in Bouru and Sula, and *P. mentalis*, n. s., in Batchian, Ternate, and Gilolo*.

* PACHYCEPHALA MENTALIS, n. s. *P. flavo-olivacea; capite, genis mentoque nigris; gula late alba; lunula pectorali nigra; subtus cum torque nuchali vivide flava; cauda ejusque tectricibus superioribus nigris; remigibus fusco-nigris, primariis olivaceo limbatis, aliis tectricibusque alarum flavo-olivaceo marginatis; rostro nigro, pedibus fusco-olivaceis.*
Long. 7, alar. 3·7, caudæ 2·10, poll. et duodecim.
Hab. Ins. Batchian et Gilolo.
This may be *Turdus armillaris*, Temm., or *Lanius cucullatus*, Licht. (Bp. Consp. p. 328); but I can find no descriptions of those species, and therefore give this bird a name descriptive of a peculiarity confined to it. *Laniarius albicollis*, Vieill., is different from this and apparently from any other described species.

DICRURUS AMBOINENSIS.

Dicrurus amboinensis, G. R. Gray, P. Z. S. 1860, p. 354.

Hab. Bouru.

Remark.—The specimens are rather larger and better-coloured than those from Amoöina and Ceram, but otherwise agree with them.

CAMPEPHAGA MARGINATA.

Supra plumbea, subtus albo-cinerea; loris fusco-nigris; tectricibus caudæ et alarum inferioribus albis; remigibus et tectricibus alarum majoribus nigris, albo marginatis; rectricibus extimis utrinque tribus albo terminatis.

Bluish lead-colour above, ashy white beneath; base of wings beneath and under tail-coverts white; wings and tail black; primaries white-margined on the inner web near the base; secondaries, tertiaries, and greater wing-coverts white-margined towards the points; middle tail-feathers ashy, with a black tip, outer ones with the outer margin and tip ashy, the next two with diminishing ashy tips; bill and feet black; iris dark.

Total length 8½ inches; wing 4¼ inches.

Hab. Bouru.

Remarks.—This species somewhat resembles *C. plumbea*, but is smaller and paler beneath, and the bill is more slender.

TROPIDORHYNCHUS BOURUENSIS.

Cinereo-brunneus, subtus pallide cinereus; gula et capitis lateribus plumis subrigidis subsericeis; alis caudaque subtus fuscis; rectricum lateralium utrinque duarum apicibus tenuiter fulvescentibus; facie nuda nigra; protuberantia ad basin rostri nulla.

Above ashy brown; head somewhat paler, with lanceolate feathers, the stems of which are black; beneath pale ashy; the plumes of the throat and upper part of the breast and the marginal feathers of the head and face somewhat rigid, of a silky lustre, and with darker stems; quills dusky, with the inner margins of a paler fulvous tinge; tail uniform dusky, the two outer feathers on each side with the apex on the inner side of paler fulvous colour; orbits and cheeks bare, black; bill black, without any protuberance at the base; feet pale lead-colour; iris light olive.

Length 14½ inches; wing 6 inches; tail 5½ inches; bill, to front, 1¾ inch.

Hab. Bouru.

Remarks.—This species is the subject of imitation by a bird of quite distinct family (Oriolidæ), as fully explained under *Mimeta bouruensis*, which bird is the *Tropidorhynchus bouruensis*, Bp., ex Lesson.

ZOSTEROPS CHLORIS.

Zosterops chloris, Bp. Consp. Gen. Av. p. 398.

Hab. Bouru, Ternate, and Banda.

"Iris pale brown; bill dusky black above; beneath and feet lead-colour."

DICÆUM ERYTHROTHORAX.

Diceum erythrothorax, Less. Voy. Coquille, Ois. t. 30. f. 1, 2.
Hab. Bouru.
Remark.—An allied species to this occurs in Ceram, of which I give the description in a note*.

NECTARINIA PROSERPINA.

Purpureo-nigra velutina; capite viridi-chalybeo; gula purpureo-violacea metallica; crisso, tectricibus caudæ superioribus et alarum minoribus purpureo-cyaneis; remigibus fusco-nigris; cauda elongata, rectricibus duabus mediis purpureo marginatis. ♀. Supra olivaceo-viridis, subtus flavescens; capite pectoreque cinereis; cauda fuscescenti-nigra, apice pallida.

Rich velvety purple-black; crown greenish steel-blue; throat richly scaled with violet-purple; wings, with the lesser coverts only, the rump, and upper tail-coverts metallic-blue; two middle tail-feathers margined on both sides with purple; wings and tail fuscous black.

Female.—Above olive-green; the crown and nape dark ash, each feather having a central dusky spot; beneath pale olive-yellow, the throat and breast light ash; quills dusky, with an outer margin of olive-yellow; tail purplish-black, the feathers margined on the outer web with olive-green, and a whitish spot on the inner web at the apex, increasing in size from the middle to the outer feathers.

Length 5 inches; wing $2\frac{1}{3}$ inches; tail $1\frac{1}{2}$ inch; bill, from front, $\frac{3}{4}$ inch.

Hab. Bouru.

Remark.—This beautiful species is like *N. aspasia*, but differs in its middle and greater wing-coverts being purple-black and not metallic, and in the longer tail.

NECTARINIA ZENOBIA.

Cinnyris zenobia, Less. Voy. Coq.
C. clementiæ, Less. Man. d'Orn. ii. p. 40.
Hab. Bouru, Amboyna, Ceram, and Ké Islands.

CALORNIS OBSCURA.

Lamprotornis obscura, Bp. (ex Forsten) Consp. Gen. Av. 417.
Hab. Bouru and the other Moluccas.

* DICÆUM VULNERATUM.

Supra æneo-fuscum, subtus cinereum; abdomine albescente; macula parva pectorali tectricibusque caudæ superioribus rubris.
Fem. *immaculata.*

Above dark fuscous brown, with a bronzy tinge; beneath light ashy, becoming nearly white on the belly and vent; a small round patch on the breast and the upper tail-coverts bright red; under wing-coverts and sides of breast white; bill black, bluish at the base; feet black. The female (?) or young bird is rather lighter on the upper and darker on the under surface than the male, has no red spot on the breast, and the upper tail-coverts are reddish olivaceous.

Total length 3 inches; wing 2 inches.

Hab. Ceram.

MUNIA MOLUCCA.

Loxia molucca, L.; Pl. Enl. 139. 2.
Hab. Bouru and the Moluccas.

TRERON AROMATICA.

Columba aromatica, Gm.
C. viridis amboinensis, Br. Orn. i. p. 146; Pl. Enl. 163 (fig. pessima).

Bill, cere, and eyelids pale dull blue, tip of the bill becoming yellow in dry specimens; iris white; feet dusky purple.

Total length 11½ inches; wing 6 inches.

Hab. Bouru, and probably Amboyna and Ceram.

Remarks.—Brisson's description of this species is most accurate, and, with the bird before one, cannot be mistaken. The figure in the 'Planches Enluminées' is abominable, but no doubt applies only to this bird. Gmelin copies Brisson; but makes an error which would prevent one recognizing the bird, in saying that "the *upper* tail-coverts are sordid white," instead of the *lower*. This bird is the true *Treron aromatica* (as being an inhabitant of the Spice Islands), a name which has been applied to birds of distinct species from India, Sumatra, and the Philippine Islands. It is easily distinguished from all its allies by having the top of the head ashy blue, not reaching below or even to the eyes, by the broad yellow bands on the wings, and by the under tail-coverts being nearly pure white in *both sexes*.

CARPOPHAGA MELANURA.

Carpophaga melanura?, G. R. Gray, P. Z. S. 1860, p. 361.
Hab. Bouru and all the Moluccas.

Remarks.—This species is certainly distinct and peculiar to the Moluccas, *C. luctuosa* being found only in Celebes on the west, and *C. bicolor* in the Papuan Islands to the east of it. Bill greenish horn-colour; tip greenish yellow; feet lead-colour; iris nearly black.

CARPOPHAGA PERSPICILLATA, var.

Columba perspicillata, Temm. Pl. Col. 246.
Hab. Bouru, Batchian, Gilolo, and Waigiou Islands.

Remarks.—The true *C. perspicillata* of Temminck is probably that of the islands of Ceram and Amboyna, which has the head and neck of nearly the same whitish ash as the under surface of the body, and the quills of a powdery-ash tint; whereas in the specimens from the Northern Moluccas and Bouru the head and sides of the neck are slate-colour, the throat and breast slaty ash, and the quills purple-black, with a slight ashy tinge. The bill is bluish, pale at the tip, and red at the base; the feet pale purple, and the iris brown-black.

This variety is constant and easily distinguishable, and will probably be considered a distinct species by many naturalists; and it is only the absence of any perceptible difference in the form or proportions, or of any definite markings which can be more clearly characterized than shades of colour, which prevents me classing it as such.

PTILONOPUS PRASINORRHOUS.

Ptilonopus prasinorrhous, G. R. Gray, P. Z. S. 1858, p. 185.

Bill and its base, as far as the eye, gamboge-yellow; iris orange-brown, with an inner ring of yellow; feet dull purple.

Length 9½ inches; wing 4¾ inches.

Female entirely green; crown of head very rich green; underside rather duller; under tail-coverts yellow-margined.

Hab. Bouru, Matabello, Goram, and Kĕ Islands, belonging to the Molucca group; also Mysol and Waigiou, of the New Guinea group.

PTILONOPUS VIRIDIS.

Columba viridis, L., Pl. Enl. 142.

Bill yellow, the base red; iris yellowish red; orbits yellow; feet red.

Total length 9 inches. The male and female are alike.

Hab. Bouru, Amboyna, Ceram, and Goram.

MACROPYGIA AMBOINENSIS.

Columba amboinensis, L., Bp. Consp. Gen. Av. ii. p. 56.

Hab. Bouru and the other Moluccas.

"Bill black; iris pearly white, with an outer ring of pink; feet coral-red."

CHALCOPHAPS MOLUCCENSIS.

Chalcophaps moluccensis, G. R. Gray, P. Z. S. 1862, p. 345.

Hab. Bouru, Sula Islands, and the Moluccas.

MEGAPODIUS WALLACII.

Megapodius wallacei, G. R. Gray, P. Z. S. 1860, p. 362, pl. 171.

This species differs somewhat in its habits from the other members of the family found in the Malay Islands. It resides generally in the hilly districts of the interior, like *Megacephalon maleo*, and, like that species, comes down to the beach to deposit its eggs; but instead of scratching a hole for them and covering it up again, the bird burrows into the sand to the depth of 3 or 4 feet obliquely downwards, and deposits its egg at the bottom. It then loosely covers up the mouth of its hole; and is said by the natives to obliterate and disguise, by innumerable tracks and scratches, its own footmarks leading to the hole. Its offspring is then left to make its way into the world as it best can. The only specimen I obtained here was caught on the beach, at the mouth of its burrow, early one morning. Its wing was broken and wounded at the outer joint, as if it had been attacked by some small animal when in its burrow, probably a rat.

Hab. Bouru, Gilolo, and Ternate.

MEGAPODIUS FORSTENI.

Megapodius forsteni, Gray & Mitch. Gen. of Birds, iii. pl. 124.

Hab. Bouru, Amboyna, and Ceram.

This bird deposits its eggs in a heap of rubbish collected in low places near the sea. It is seminocturnal in its habits, making a loud wailing cry, which is often heard at night and about daybreak.

GLAREOLA GRALLARIA.

Glareola grallaria, Temm.
G. australis, Leach, Linn. Trans. xiii. pl. 14.
Hab. Bouru and Australia.

ESACUS MAGNIROSTRIS.

Charadrius magnirostris, Lath., Temm. Pl. Col. 387.
Hab. Bouru, Celebes, and New Guinea.

NUMENIUS UROPYGIALIS.

Numenius uropygialis, Gould, B. of Austr. vi. pl. 43.
Hab. Bouru, the Moluccas, and New Guinea.

BUTORIDES JAVANICUS.

Ardea javanica, Horsf. Linn. Trans. xiii. p. 190.
Hab. Bouru and the whole archipelago.

ARDETTA FLAVICOLLIS.

Ardea flavicollis, Lath. Ind. Orn. ii. p. 701.
Hab. Bouru, and from India to Australia.

NYCTICORAX CALEDONICUS.

Ardea caledonica, Gm.: Gould, B. of Austr. 6. t. 63.
Hab. Bouru, Moluccas, and Australia.

GALLINULA FRONTATA.

Fusco-plumbeo-nigra; dorso alisque olivascentibus; cauda nigra; tectricibus caudæ inferioribus lateralibus albis, mediis nigris; rostro rubro, apice abrupte luteo; clypeo frontali magno, dilatato, supercilia attingente; pedibus rubris, fusco articulatis, tibiis subtus olivaceis.

Very near *G. tenebrosa*, Gould, but distinguishable from that species by the differently-coloured back and wings, which are olivaceous brown instead of black, the rather slenderer bill, the very large frontal plate, and the more uniform-coloured legs, the joints of the tibiæ and tarsi being dusky olive, the median line of the tibiæ beneath olive-green, the tarsi beneath dusky lead-colour; the lateral under tail-coverts pure white, the middle ones black; the rest of the plumage of a dusky lead-colour, deepening on the top of the head and neck to nearly black, and on the breast tinged with brown; wings brownish olive; tail black.

Total length 13 inches; wing 7 inches; bill, from back of frontal plate, 2 inches.

Hab. Bouru.

RALLINA PHILIPPENSIS.

Rallus philippensis, L.
Hab. Bouru and the islands eastward.

DENDROCYGNA GUTTULATA.

Anas guttulata, Temm.
Hab. Bouru, Ceram, and Celebes.

TADORNA RADJAH.

Anas radjah, Less. & Garn. Voy. Coq. Zool. pl. 49.

Eyelids yellow; iris milk-white; bill and feet white; claws dusky white; nostrils blackish.
Total length 21 inches.
Hab. Bouru, the Moluccas, and New Guinea.
Remarks.—Lesson describes the bill and feet of this bird as *red*. In dried specimens they become of a dull reddish white; but in the living bird are entirely white. Lesson's specimen was obtained in Bouru.

PODICEPS TRICOLOR.

Podiceps tricolor, G. R. Gray, P. Z. S. 1860, p. 366.

Bill black; base of the lower mandible lemon-yellow, which extends up towards the eye.
Hab. Bouru and the Moluccas.

5. Descriptions of Five New Species of Fishes obtained at Madeira. By James Yate Johnson, Corr. Mem. Z. S.

(Plate VII.)

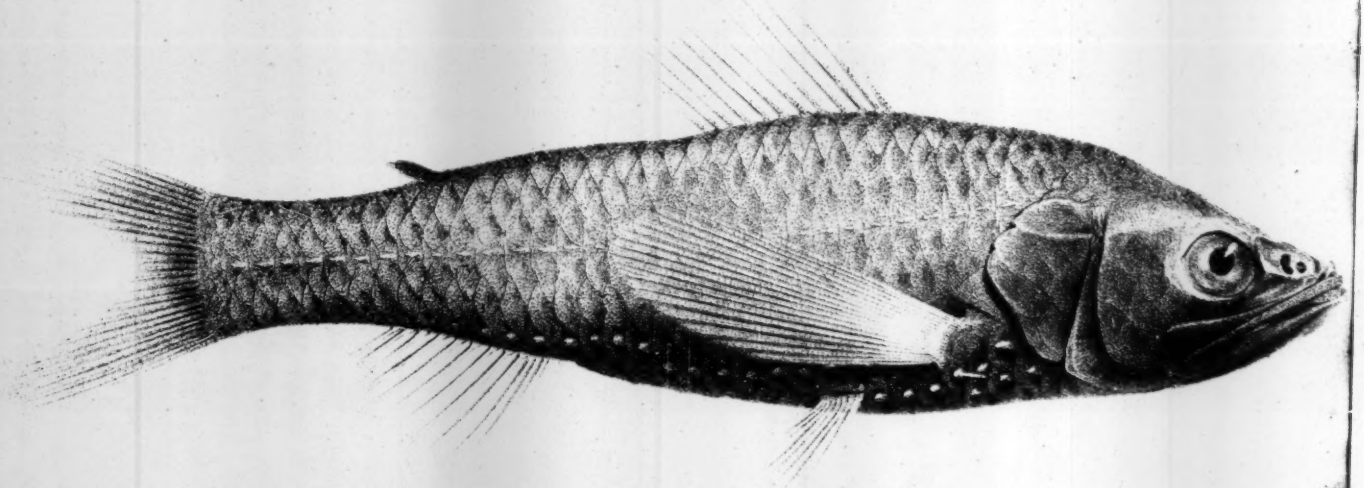
Fam. Scombridæ.

BRAMA PRINCEPS, sp. n.

D. 5.27–33. P. 20. V. 1.5. A. 3.26. C. iv. 15. iv. M. B. 7.

Body oval, compressed, and elevated, the height compared with the length being as 1 to $2\frac{1}{2}$ or $2\frac{3}{5}$. It is of a blackish-grey colour, beautifully reflecting white and iridescent hues. A coppery lustre is reflected in certain lights from the sides of the body and the head. The hinder portion (black) of the body is covered with large striated scales; those on the head have finely pectinated edges, those on the body have simple borders. Between and in front of the eyes the head is scaleless.

The head is short and abrupt; its length to that of the whole fish is as 1 to $2\frac{2}{3}$. The *eye* is vertically oval; the pupil a pale grey, the iris a dark brown. It is contained about $4\frac{1}{3}$ times on the head, and is removed from the muzzle by a space equal to about $1\frac{1}{3}$ times its longer axis. Above it there is a space equal to $1\frac{1}{2}$ times its longer axis, and below it a space equal to twice that axis. There is only



G. Hary, del.

W. & N. Hanhart, imp.

NEOSCOPELUS MACROLEPIDOTUS

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one opening on each side to the pituitary sac, and that is small and transversely oval. The mouth-cleft is small and subvertical; the under jaw rather longer than the upper. The superior border of the mouth is formed by the narrow premaxillary, much of which, when the mouth is closed, passes underneath the maxillary. The latter is much dilated below, and its exposed portion is triangular. It reaches back to the vertical from the middle of the eye. There are small scales on the premaxillary, and large ones on the maxillary. There is a broad band of small conical, slightly curved teeth, narrowing backwards in each jaw, the innermost row being slightly longer. There is also a narrow band of small teeth on the palatines; but the vomer and tongue are unarmed. The tongue is broad, fleshy, and black. Inside the teeth in each jaw there is a black flap extending from one side of the mouth to the other. The opercular pieces are clothed with scales, and their margins are unarmed and rounded.

The long *dorsal* fin is very high and falcate in front, this portion being covered with small scales. The fin is low behind, and near its termination the broadly expanded apices of the rays project beyond the membrane. The length of the fin, compared with the total length of the fish, is as 1 to $2\frac{1}{7}$. The *pectoral* fins are long, pointed, and subfalcate, and they reach back as far as the middle of the dorsal fin. The base is clothed with small scales; and in the axil there is a membrane bearing eight or nine scales, which connects the upper side of the base with the side of the body. When the fin is pulled away from the body, these scales spread out and cover up the hollow of the axil. The *ventral* fins are inserted under the bases of the pectorals; they are short, and their apices are truncate. The spine is very short, and there is a scale-like appendage in the axil. The long *anal* fin resembles the dorsal in shape, being high and falcate in front; the falcate portion scaly; the hinder portion low, with the rays projecting beyond the membrane. It terminates on the vertical of the termination of the dorsal. The *vent* is placed a little before the commencement of the anal fin. The *caudal* fin is lunate, and has a wide spread; its base is scaly.

The middle portion of the tail is raised or thickened longitudinally, so as to form a kind of flat, broad keel. Near the base of the caudal fin there are some transverse grooves above and below.

Forty-five rows of scales may be counted between the border of the opercle and the base of the caudal fin, and on the fin itself there are nine or ten rows of small scales. There are about twenty-five series of scales in the height of the body. The scales are very broad, and their surfaces are radiate-striate, *without the slightest trace of an umbo or spine.*

One of the examples, measuring $32\frac{1}{2}$ inches in length, proved on being opened to be a female, and had an egg-sac $3\frac{1}{2}$ inches long and $1\frac{1}{4}$ inch across. There were five stout pyloric cæca, four of which were 3 inches long, the fifth only half as long. The intestine was convoluted, and 22 inches in length. The stomach was small the liver of moderate size; the gall-bladder large.

The fishermen call this handsome fish "Freira do alto," *Brama raii* being called "Freira." Several specimens have been taken in the months of February and March, the lengths of which ranged from 27 to 33 inches.

In form it bears a close general resemblance to *Brama raii*, which, however, is less thick in proportion, has much smaller scales, and is without the broad ridge at each side of the tail and the white borders of the vertical fins. Moreover in that species the anterior portions of the dorsal and anal fins are much less developed. If admitted into the genus *Brama*, the definition of that genus given in Dr. Günther's Catalogue will require modification in regard to the size of the scales, the number of the dorsal spines, and the jaw-teeth, which are there said to have an outer series of stronger teeth. No such series is discoverable in the species now described.

The following measurements were taken from two examples of nearly the same length :—

	A. inches.	B. inches.
Total length	32½	33
Height	13	13
Thickness under anterior part of dorsal	4	4
Length of body without caudal	..	25
Head	6½	7⅓
Eye, diameter	..	1¾
Teeth, width of band on jaws	9/20	2 7/10
Rictus	..	2 7/10
Dorsal, distance from muzzle	8¾	10¼
——, length of base	14	
——, height in front	6	7½
Pectorals, distance from muzzle	7½	
——, length	..	8⅞
Ventrals, length	1¼	1½
Anal, length	10½	
——, height in front	6	
——, distance from muzzle	..	14½
Caudal, expanse	12	12
Scales of body, width	1½	

Fam. Tæniodeæ (Lophotidæ, Günther).

Lophotes cristatus, sp. n.

D. about 255. P. 13. V. 5. A. 19. C. 15. M. B. 6.

Elongated, compressed, blade-like; the line of the unarmed belly nearly straight; the back curving upwards slightly for the first third, then falling gently to the tail. The height of the body, compared with the length, is as 1 to 5¼. The colour is uniformly a silvery grey, without spots. The body is clothed with simple scales, which are buried in the skin, and set obliquely so as to give a reticulated appearance. They are rather large and very delicate.

The head is short and unarmed; it bears a high fleshy crest, the

horizontal line of which is straight with the back. This crest carries the anterior portion of the dorsal fin, and it projects, at an acute angle, beyond the vertical of the snout. At the angle rises a single bony ray, which is equal in length to one-fourth of the total length of the fish. A fringe of red membrane connects it with the dorsal fin, of which it appears to be the first ray. The edges of the gill-covers are simple, the bones radiate-striate. The round *eye* is large, its diameter being contained three times in the head; the iris is silvery white, the pupil oval. The space intervening between it and the front of the head above the jaw is much less than a diameter; but the space between the edge of the capital crest and the superior part of the orbit is considerably more than a diameter. The space between the eye and the snout is reddish and scaleless. The *mouth* is oblique and rather small; the rictus about two-thirds the diameter of the eye, and its width almost equal to a diameter. There are about four rows of small conical-pointed *teeth*, which curve backwards, at the front of the premaxillary; and about two rows of similar teeth at the sides of the lower jaw, whilst in front they are crowded four or five deep. Small teeth, very few in number, are planted on the vomer and on the anterior extremities of the palatine bones; but there are none on the tongue. Inside the mouth, above and below, there is stretched a black membrane from side to side. The maxillary is toothless, and is much dilated below. It covers the premaxillary at the sides, and reaches back to the vertical through the middle of the eye.

The single *dorsal* fin extends from the capital crest to the caudal fin, from which it is not easily distinguished. Behind the long bony ray, already mentioned, it is low, the middle portion being higher than the rest. The base is sheathed in transparent membrane, an extension of the skin. The *pectoral* fins are of moderate size, placed low down, and at a distance from the top of the lower jaw equal to about an eighth of the total length of the fish. The first ray is bony and very strong, but not longer than the rest, which are branched. The *ventral* fins are very short, and are inserted a little behind the pectoral fins, and only slightly below them. Only five slender, simple rays were counted in the specimen. The *anal* fin is low, it is placed far behind, near the caudal fin, and its first three or four rays are short. The *vent* is placed just before the fin. The tail behind the anal fin has parallel margins, and is much compressed. It is low, and its lower edge is finless; whilst its upper edge carries the posterior portion of the dorsal fin. The *caudal* fin is short, and is not well distinguished from the dorsal fin; but there seem to be fifteen rays, viz. ten below the lateral line and five above. The lower angle only projects. This fin is not set on obliquely, as in some of the genera of the family.

The unarmed *lateral line* descends at an angle of 45° from the angle of the capital crest to behind the eye; it is then straight along the body to the base of the caudal fin.

The *stomach* is cæcal, narrow, and tapers downwards. Numerous cæca are attached to the intestine. The intestinal canal is long and

straight; the egg-sac long and forked; the liver of moderate size. The stomach of the specimen examined contained the much-digested remains of a small fish and a Cephalopod.

Only a single individual of this curious fish has occurred. The single species of the genus hitherto known, a Mediterranean fish (*Lophotes cepedianus*, Giorna), appears to be likewise very rare; for M. Valenciennes (Hist. Nat. des Poiss. x. 401) says that only three specimens had been examined by naturalists, two of which had been deposited in the Museum at Turin, and the third in the Museum at Paris. In the British Museum are two stuffed specimens and one preserved in spirits. The differences between the Madeiran fish and the Mediterranean fish (as described in the Hist. Nat. des Poiss.), which seem to justify the formation of a new species, are these:—In the latter the height, compared with the length, is said to be as 1 to 7; and the thickness, compared with the height, as 1 to 3; whereas in the Madeiran fish the height is to the length as 1 to $5\frac{1}{4}$, and the thickness to the height as 1 to 6. Moreover, Valenciennes says the skin is without scales, that its silvery-grey colour is relieved with round spots of pure white, and that all the fins are of a lively rose. Now the skin of the fish here described possesses scales, and the colouring of the body and fins is a uniform grey. I may add that I have examined the fish preserved in spirits at the British Museum, but I could not detect any scales in the skin. The dimensions of the specimen which will hereafter find its way to the British Museum are given in the following table:—

	inches.
Total length	50
Height (14 inches from snout)	$9\frac{1}{2}$
Height of head through the eye	$7\frac{1}{2}$
Thickness for the greater part of body	$1\frac{1}{2}$
Head	$6\frac{1}{2}$
Eye, diameter	$2\frac{1}{8}$
——, distance from front of head	$1\frac{1}{2}$
——, distance from edge of crest	$3\frac{8}{10}$
Mouth, rictus	$1\frac{1}{2}$
——, width	2
Teeth, length	$\frac{1}{10}$
Maxillary, width below	$\frac{3}{4}$
Dorsal, length of first ray	$12\frac{1}{3}$
——, height of middle portion	2
Pectorals, length	$3\frac{1}{2}$
——, distance from tip of lower jaw	$6\frac{3}{4}$
——, distance from lower edge of body	$1\frac{1}{8}$
——, width of base	$\frac{8}{10}$
Ventrals, length	$\frac{1}{2}$
——, distance from root of pectorals	$\frac{7}{10}$
Anal, height	$\frac{8}{10}$
——, distance from caudal	$1\frac{1}{2}$
Tail, height	$\frac{7}{10}$
Caudal, length at lower angle	$1\frac{1}{10}$

Fam. Scopelidæ.

Saurus atlanticus, sp. n.

1st D. 13. 2nd D. adipose. P. 11. V. 8. A. 9. C. 18. M. B. 16.

Form of *Saurus lacerta*, i. e. elongate and cylindrical. The height, compared with the length, is as 1 to 7 nearly. The head, cheeks, and back are of a dull red colour, with irregular patches of bluish purple. The belly is white, as well as the sides, which, however, are variegated with irregular patches of dull red and brownish yellow, arranged alternately and longitudinally. The rays of the first dorsal fin are spotted with red. The anal fin is blotched with reddish marks in transverse lines, and with some opaque white marks. The cycloid scales are of moderate size.

The long, depressed, unarmed *head* is contained in the total length about $4\frac{1}{4}$ times. The space between the eyes is hollowed, and the head behind the eyes is flat and marked with radiating striæ. Near the tip of the muzzle there is a shield-shaped depression. There are scales on the cheeks, and the opercle is bordered with a transparent membrane. The *eye* is nearly round; its diameter is equal to one-seventh of the head, and it is distant about two diameters from the tip of the muzzle. It is placed rather before the middle of the upper jaw, and the upper part of the orbit forms part of the profile. The space between the eyes is rather less than a diameter. The lower jaw is more pointed than the upper, the upper rather longer than the lower. The rictus is long, being equal to the height of the fish, and extending much beyond the eyes. The upper border of the mouth is formed entirely of the strong and thick dentiferous premaxillary, the much weaker maxillary lying behind. Both bones are covered, like the bones of the lower jaw, with a thick scaleless skin. In the lower jaw there are two rows of small slender teeth with hastoid apices; those of the inner row are larger, they are rather distant from each other; and in the intervals are set some very shorter teeth of the same shape. All these teeth are directed inwards. In the upper jaw there are also two rows of similarly shaped teeth, which are about equal in size to those of the inner row in the lower jaw. The teeth of the inner row are moveable. On the tongue are several irregular rows of slender teeth, directed backwards. On the palatines are about three rows of acicular moveable teeth, which are more slender than those of the jaws. There are also teeth on the pharyngeal arches, but none on the vomer.

The gill-openings are large, and the branchiostegal membrane is supported by sixteen rays on each side.

The *first dorsal* fin has a trapezoidal shape, and rises from a shallow groove posterior to the base of the ventral fins. It is short, and terminates over the middle of the body. The two first rays are unbranched; the longest rays are the second and third, which neither equal the height of the trunk nor the base of the fin. The minute *second dorsal* fin is adipose, without rays, and is placed over the middle of the anal fin. The *pectoral* fins are about one-eleventh of

the total length of the fish, and about half as long as the ventral fins; the first ray is shorter than the succeeding three, but longer than the last. The *ventral* fins are inserted about halfway between the pectoral and first dorsal fins. Their length is about one-fifth of the total length of the fish. The lower rays are longer, the last but one being the longest in the fin. The *vent* is far behind, being three-fourths of the length of the fish, minus the caudal fin, from the muzzle. The *anal* fin is short, and rises out of a shallow groove. The *caudal* fin has eighteen rays, besides short external rays. On each face of this fin there are two scale-like appendages, such as are seen in *Saurus lacerta* ("un appendice écailleux prolongé en une petite palette."—*Valenciennes*).

The *lateral line* is straight, and is placed rather above the middle of the body.

This description has been drawn up from a single specimen, obtained in the month of April, which has been sent to the British Museum. Another example, taken in May, only a trifle more than 3 inches long, had fourteen rays in the first dorsal fin, and ten rays in the anal fin. There was a distinct dark spot at the tip of the muzzle.

The fish described by Mr. Lowe, in the 'Trans. Zool. Soc.' vol. ii. p. 183, under the name of *Saurus griseus*, is not to be distinguished from *S. lacerta*, as defined by Valenciennes ('Hist. Nat. des Poiss.' vol. xxii. p. 463); and to the same species is to be assigned the fish described by Valenciennes, in his 'Ichthyologie Canarienne,' under the name of *S. trivirgatus*. Both these forms have been obtained by me at Madeira.

The following are the dimensions of the larger of the two specimens of *S. atlanticus*:—

	inches.
Total length	11
Height	$1\frac{6}{10}$
Head	$2\frac{6}{10}$
Eye, diameter	$\frac{1}{10}$
First dorsal, distance from muzzle	4
—— ——, longest rays	$1\frac{1}{10}$
Second dorsal, height	$\frac{8}{10}$
—— ——, width	$\frac{3}{20}$
Pectorals, length	1
Ventrals, length	2
——, distance of their vertical from muzzle	$3\frac{1}{4}$
Vent, distance from muzzle	$7\frac{1}{2}$
Anal, height	$\frac{8}{10}$
——, length of base	$\frac{9}{10}$
——, distance from base of ventrals	$4\frac{1}{4}$
Caudal, length	$1\frac{1}{10}$

SCOPELUS CAUDISPINOSUS, sp. n.

1st D. 26. 2nd D. adipose. P. 12. V. 9. A. 19. C. viii. 10+11. vii. M. B. 10.

Body slender, with the head of a peculiar aspect, from the steep

profile, the forward eye, and the deep mouth-cleft. The height is to the total length as 1 to 7, and the thickness about one-twelfth of the total length. The scales are cycloid.

The *head* curves rapidly downwards in front of the eyes, forming a quadrantic profile. Compared with the total length, it is as 1 to $4\frac{1}{2}$. It is scaleless, unarmed, and arched above. The *eye* has a diameter equal to about one-fifth of the length of the head, and is placed less than half a diameter distant from the muzzle, which is short, blunt, and truncate. The oral cleft is oblique, and reaches much beyond the eyes. The upper border of the mouth is formed by the premaxillary, the slender maxillary lying behind. There are villiform bands of *teeth* in each jaw, on the palatines, and on the pharyngeals, as well as three longitudinal bands on the tongue, the middle one widening backwards. There are also patches of similar teeth on the entopterygoids; but the vomer is unarmed. The rakers of the branchial arches carry small teeth. The gill-openings are large, and the gill-covers are of a dark blue colour inside; the opercle has an angular form near the root of the pectoral fin.

The *pectoral* fin is small, being to the total length as 1 to $11\frac{1}{2}$. It is inserted low down, and reaches nearly to the root of the ventral fins. The *first dorsal* fin is placed at the middle of the back. It is higher in front, but its height does not equal that of the fish. The abdominal *ventral* fins are inserted under the anterior part of the first dorsal; they do not reach quite so far back as the commencement of the anal fin. The *anal* fin is of moderate length; it commences under the middle of the first dorsal fin. On the upper edge of the tail there are eight small sharp spines, followed by two larger spines; on the lower edge are nine small spines, followed by two larger ones.

The single example of this fish that has occurred (taken in the month of February) was so much damaged that little can be said about the scales or colour. It appeared, however, to have been nearly black; but there were no traces of silvery spots on the sides. The muscles abounded with oil.

It appears to be nearly allied to *Scopelus crocodilus*, Valenciennes, who assigns twenty rays to the first dorsal and eighteen rays to the anal fins of that species (H. N. Poiss. xxii. 447). Of that fish it is stated that the eye is contained $3\frac{1}{2}$ times in the head, and that the pectoral fins do not reach to the ventral fins. No dark blotch at the base of the caudal fin was observed in my fish. It would seem to fall into Rafinesque's subgenus *Myctophum*; but it is distinguishable from all the four species described and figured in the 'Fauna Italica,' by the greater length of the first dorsal fin, and by the larger number of rays in that fin, which, in the four species referred to, range from twelve to seventeen.

The following are the dimensions of the example which has been sent to the British Museum:—

	inches.
Total length	$6\frac{1}{3}$
Height under first dorsal	$\frac{9}{10}$

	inches.
Thickness	$\frac{1}{2}$
Head	$1\frac{4}{10}$
Eye, diameter	$\frac{2}{10}$
Mouth-cleft, length	$\frac{9}{10}$
First dorsal, distance from muzzle	2
——— ———, height	$\frac{9}{10}$
——— ———, length of base	$1\frac{8}{10}$
Pectorals, length	$\frac{6}{10}$
Ventrals, length	$\frac{7}{10}$
———, distance from tip of mandible	2
Anal, length of base	$1\frac{1}{5}$
———, distance from tip of mandible	$2\frac{9}{10}$
Caudal, length	$1\frac{1}{10}$

NEOSCOPELUS, gen. nov.

Oblong, compressed, covered with large caducous scales. First dorsal fin placed over the abdominal ventral fins. The pectoral fins long; their inferior rays not thicker than the rest. Mouth-cleft not extending beyond the eyes. The maxillary dilated below, and furnished with a small supplementary piece. The upper border of the mouth formed entirely of the premaxillary. Scobinate bands of teeth in both jaws, on the palatine bones, and on the vomer; scobinate patches of teeth on the entopterygoids. Branchiostegal membrane with nine rays.

This new genus is allied to both *Aulopus* and *Scopelus*. In its moderate number of branchiostegal rays and scopeloid form of body it approaches the latter genus; the shape of the teeth and the dentiferous vomer ally it to the former. From *Odontostomus* it is distinguished by the moderate size of the eye and the immobility of the teeth; from *Lampanyctus* by the greater height of the body and by the comparatively short rictus, which, in that genus, extends much beyond the eye.

NEOSCOPELUS MACROLEPIDOTUS, sp. n. (Pl. VII.)

1st D. 4.9. 2nd adipose. P. 18. V. 8. A. 13. C. iv. 10+9. iii. B. M. 9. Scales of lateral line 30.

Oblong, compressed, the height contained $4\frac{1}{2}$ times, and the thickness 10 times in the total length. Back and sides dark red, becoming uniformly fuscous in spirit; cheeks silvery; throat and belly black; the scales on the belly having a pearly iridescent centre, and forming about five longitudinal rows of spots; all the fins a pinky red, approaching scarlet. None of the fins, except the caudal, are scaly.

The *head* is contained rather less than four times in the total length. It is somewhat compressed, and the cheeks are flat. On the vertex, above the posterior margin of the eyes, are two small spines. The opercular pieces, the head between the eyes, and the jaws are scaleless. The upper part of the opercle is marked by a low longitudinal ridge. The neck and shoulder are rather high.

Between the eyes are two broad, shallow, longitudinal grooves, with two low ridges between them. This part has an adipose or gelatinous appearance, and it is marked with some twenty or more transverse beaded lines, and in the neighbourhood of the eyes with numerous gelatinous papillæ. The round *eye*, the iris of which has a golden-greenish colour, is contained about five times in the head, and is placed at a distance of not quite a diameter and a half from the tip of the muzzle. It is surrounded by an adipose border, which intrudes upon it at the antero-superior side, and which has a small notch at the posterior side. The distance from eye to eye is nearly equal to a diameter and a half. The nostrils are close together, and placed halfway between the eye and the jaw; the hinder one of each pair is large. The muzzle is rounded, and short but not abrupt. There is a protuberance on the premaxillary, behind the symphysis of the jaw. The under jaw projects slightly beyond the upper. The upper border of the mouth is formed entirely of the premaxillary, behind which is the toothless maxillary, having a length one-half that of the head. The latter is dilated below, is furnished with a very small and narrow supplementary piece, and extends back to the vertical from the posterior border of the eye. There is a scobinate band of teeth on each jaw, the inner rows being rather larger and almost cardiform. A portion of these dental bands is seen outside the mouth when it is closed. A narrow band of similar teeth is found on the palatines, and a chevron-shaped patch on the vomer. The thick tongue is toothless in front; but behind there is a narrow band of small teeth along the middle as far as the branchiæ extend. On the entopterygoids there are large oval patches of minute teeth. On the outermost free branchial arch are long rakers, of which one edge is set with a band of minute teeth; and on its hinder surface is a series of short rakers, the apices of which bear numerous minute teeth. The other branchial arches bear short stout rakers, which have teeth at their ends; and the hinder faces of these arches have similar processes to those of the first arch.

The tongue, the mouth, and the insides of the gill-covers are bluish black. The gill-openings are large. The delicate branchiostegal membrane is supported by nine rays, of which the first is hair-like, and the last very broad, with a raised posterior edge. The *first dorsal* fin has a trapezoidal shape, and is placed well forward over the ventral fins. The four first rays are unbranched, and the first of these is very short. The longest ray is the fifth, and this is about two-thirds the length of the head. The *second dorsal* fin is adipose and scaleless; it is placed over the hinder part of the anal fin. The *pectoral* fins are longer than the ventral fins. They have about two-thirds of the height of the fish above their bases, and they reach back beyond the end of the first dorsal fin, but not quite so far as the vent. Their inferior rays are not thicker than the rest. The abdominal *ventral* fins have stout rays, and the first one is unbranched and shorter than the next three, which are about equal to each other. The abdomen is flat between the roots of these fins. The *vent* is immediately in front of the trapezoidal *anal* fin, the first ray of which

is unbranched and very short; the fourth ray is the longest. The *tail* is much compressed. The *caudal* fin is deeply furcate, spotted with minute black spots, and covered with small scales.

The distinct *lateral line* descends rather rapidly from the shoulder; but from the pectoral region it is straight along the middle of the body. The caducous scales which clothe the body are large and remarkably broad, with the exposed margins armed with several rows of small spines. Those of the lateral line are about thirty in number, and in the height of the body ten rows may be counted, viz. four above, and five below the lateral line, which is itself formed of the tenth row.

Of this species only a single example (now in the British Museum) has occurred, and this was taken in the month of January. Its dimensions are given below:—

	inches.
Total length	10 5/10
Height, a little in front of first dorsal	2 3/10
Thickness	1 1/2
Head	2 3/4
Eyes, diameter	1/2
——, distance apart	7/10
Mouth, width behind when open	1
——, length of upper jaw	1 3/8
First dorsal, distance from muzzle	3 1/2
—— ——, length of base	1 3/4
—— ——, length of first branched ray	1 5/8
—— ——, length of last ray	3/8
Second dorsal, height	1 1/2
—— ——, distance from first dorsal	1 3/4
Pectorals, length	2 1/2
——, distance from muzzle	2 2/3
——, width of base	4/10
Ventrals, length	1 1/2
——, distance behind pectorals	1
Vent, distance of vertical from muzzle	5 8/10
Anal, length of fourth ray	1 1/4
——, length of base	1 1/4
——, distance from ventrals	2 3/4
Tail, height	1/2
Caudal, length	2

The following list of additions to the Menagerie during the month of December was read to the Meeting :—

		Presented by
2 Cormorants	*Phalacrocorax carbo*	Sir H. Stracey, Bt., M.P., F.Z.S.
2 Chameleons	*Chamæleo africanus*	Mrs. Suffert.
A Water-Tortoise	*Emys* —— ?	T. Johnson, Esq.
A Suricate	*Ryzæna zenik*	Mrs. Borradile.
A Fallow Deer	*Cervus dama*	T. Luff, Esq.
An Iceland Falcon	*Falco islandicus*	Major Delmé Radcliffe.
2 Chinese Sand-Grouse	*Pterocles paradoxus*	Mrs. Bullock.
A Cretan Goat	*Capra beden*, Forsk	F. Guarracino, Esq.
A White-nosed Monkey	*Cercopithecus nictitans*	Mrs. Burton.
A Woodcock	*Scolopax rusticula*	The Maharajah Duleep Singh.
2 Golden-crown Parrakeets	*Conurus aureus*	Miss Langford.
2 Capuchin Monkeys	*Cebus* —— ?	E. Mackenzie, Esq.
1 Wanderoo Monkey	*Silenus veter*	A. Bryce, Esq.
1 Tuberculated Iguana	*Iguana tuberculata*	Capt. Geo. Abbott.
2 Iguanas	—— —— ?	Capt. Geo. Abbott.
A Tawny Owl	*Syrnium aluco*	Mrs. Turner.
A Chacma Baboon	*Cynocephalus porcarius*	Purchased.
A Purple Kaleege	*Gallophasis horsfieldii*	Purchased.
A Porpoise	*Delphinorhynchus phocæna.*	Purchased.
2 Merlins	*Hypotriorchis æsalon*	Purchased.
3 Golden Orioles	*Oriolus galbula*	Purchased.
1 Egyptian Sand-Lizard	*Monitor niloticus*	Purchased.
A Sooty Monkey	*Cercocebus fuliginosus*	Purchased.
6 Snakes from Dalmatia	*Tropidonotus natrix*, var. *bilineata.*	Purchased.
	Coluber æsculapii	Purchased.
	—— *quaterradiatus*	Purchased.
	Zamenis atrovirens	Purchased.
2 Hawfinches	*Coccothraustes vulgaris*	Purchased.
A Purple Pheasant	*Gallophasis horsfieldii*	In exchange.
A pair of Green-breasted Pheasants.	*Phasianus versicolor*	In exchange.
Two Polar Bears	*Thalassarctos maritimus*	Born.
A Collared Peccary	*Dicotyles tajassu*	Born.
An Egyptian Dove	*Turtur senegalensis*	Hatched.

January 27, 1863.

G. R. Waterhouse, Esq., V.P., in the Chair.

Mr. F. Buckland made some observations on the artificial reproduction of fishes, and upon the best mode of transporting their ova without risk of injury.

Mr. A. R. Wallace exhibited a nestling of *Buceros bicornis*, taken by his hunters from a nest in Sumatra, in January 1862.

Dr. Sclater exhibited a collection of insects and freshwater shells from Madagascar, transmitted to him by Mr. J. Caldwell, of Mauritius; and read the following notes respecting them, communicated to him by Mr. Caldwell:—

"The insects forwarded last mail were almost all collected in the neighbourhood of Antananarivo, two other boxes full, collected on my journey up, having been literally ground into dust by the motion they were exposed to in being carried along the road. The large Butterfly was, however, procured near Beforona, just before entering the great forest of Alamazaotra. The large Water-Beetles are those eaten by the natives at the capital, and *sold commonly in the market*; and the one with the eggs on its back is, according to the natives, *the male*, on the back of which the female lays her eggs. I have not sent any of the common locusts, which are also very extensively used as an article of food, not having been able to procure any live ones, and those for sale being all fire-dried and damaged. I have sent to the Society at least one of all the insects I was able to save, having retained here only duplicates when any existed.

"There is a vast number of Butterflies in Madagascar, as I was able to ascertain both on my last voyage and on this. I had collected at least twenty more kinds, some remarkably brilliant, and mostly very beautiful; but it is worthy of remark that from Tamatave to Antananarivo I noticed very little variety, notwithstanding the vast difference of elevation—about 5000 feet. This holds good in both the animal and vegetable kingdoms, there being of course many exceptions to the rule, which is, however, pretty well established to my satisfaction, and is cognate to a singular fact not usual in countries where a conquering race is dominant, viz. that all over Madagascar there is in reality but *one language*, though varied by dialects in different parts.

"None of the five kinds of Snakes we found last voyage and this are venomous. Only one is large; and of many specimens I measured before skinning I never found one exceed 60 inches in length. This year they appeared to be scarce, and I could not procure one to skin as I came down. In a box of skins that was lost on the road was a large black Toad, the only one I saw, about $3\frac{1}{2}$ inches long, and

rounder than our European species. I also had some Mammals, closely allied to the English Hedgehogs, but, my medicine-chest being stolen, had no chance or means of injecting them, without which they would not have kept.

"Any birds worth sending home have been already dispatched through my friend Mr. Newton; and I can only say that the country is rich enough to lead us to hope for more unknown as yet. The country west of the capital has never yet been explored.

"By the first opportunity I will forward specimens of the smaller Snakes, Chameleons, Lizards, and a small Bat, in spirits. The Chameleons I have seen attain a length of 18 inches.

"J. CALDWELL."

"Port Louis, December 4, 1862."

P.S. "I had several Aye-ayes (*Chiromys madagascariensis*) in my possession at Tamatave to send to Mauritius; but none arrived alive. One that died in Tamatave I skinned, and gave the skin to Captain Wilson, of H. M. S. 'Gorgon.' In so doing, I noticed what I have not yet seen in any of the published accounts, namely, that the *lower jaws* at the junction of the chin are only connected by a strong ligament, and do not, as in most other animals, virtually form one connected semicircle of bone. They play easily in a vertical direction, independently of each other, and, when the animal is gnawing, *alternately*. This accounts for the prodigious power of gnawing the Aye-aye possesses; for I have seen one cut through a strip of tin plate 2 inches wide, nailed over the door of its cage. As there is the usual vertical and lateral motion of the lower jaw, and this independent power superadded, its effect is not astonishing."

The following papers were read:—

1. DESCRIPTION OF A NEW SPECIES OF THE GENUS DROMICIA, DISCOVERED IN THE NEIGHBOURHOOD OF SYDNEY. BY GERARD KREFFT.

DROMICIA UNICOLOR, sp. nov.

Dentition.—Incisors $\frac{3-3}{1-1}$. Canines $\frac{1-1}{1-1}$. Præmolars $\frac{3-3}{3-3}$. Molars $\frac{3-3}{3-3}$. = 36.

Of the grinders in the upper jaw, two are large and four cuspidate; but the last one is much smaller, of a triangular form, and furnished with three cusps only. The præmolars are three in number, of which the posterior one is large, and furnished with two fangs and two roots; the other two are rudimentary, with flat surfaces; there is an interspace between these teeth and the long canine; of the three incisors the anterior one is the largest.

In the lower jaw there are three true molars, with four cusps to each, but the last or posterior one smaller than the other two; these are preceded by a large two-rooted false molar (which, in one specimen examined, is furnished with one, in the other with two fangs),

the anterior præmolars (two) and the canine being small and rudimentary, with flat crowns; the single incisor is very long.

Coloration.—Fur of a uniform mouse-colour, lighter on the sides and beneath, with a blackish patch in front of the eye.

All the hairs are slate-grey at the base, tipped with yellowish at the back and sides, and with grey beneath; longer black hairs, tipped with white, are interspersed, except on the underside of the body. Bristles black to within one-third of the tip, which is white; a few long bristly black hairs in front and behind the eye. Tail somewhat longer than the body, prehensile, thin, showing every joint; slightly enlarged at the base, and gradually tapering; covered with a mixture of light-coloured and black hairs; apical portion, about $\frac{1}{2}''$ from the tip, wide beneath.

	inches.
Length from tip to tip	$6\frac{1}{4}$
Tail.....	$3\frac{1}{4}$
Face, to base of ear	$\frac{1}{8}$
Ear.....	$\frac{1}{2}$
Arm and hands	$\frac{1}{5}$
Tarsi and toes	$\frac{5}{8}$

This beautiful little creature was captured near St. Leonard's, North Shore, Sydney, feeding upon the blossoms of the *Banksiæ*, and lived a few days in captivity. In its habits it is nocturnal. The tongue of this *Dromicia* is well adapted for sucking the honey from the blossoms of the *Banksiæ* and *Eucalypti*, being furnished with a slight brush at the tip. This species differs from the *D. concinna* of Western Australia in being of a uniform dark colour without the white belly, and having the base of the tail slightly enlarged; it is of about the same size as *D. concinna*.

2. Notice of a New American Form of Marsupial. By R. F. Tomes, Corr. Memb.

(Plate VIII.)

Genus Hyracodon, Tomes.

General form somewhat slender. Tail as long as the head and body, tapering evenly to a fine point. Feet long, and furnished with an opposable thumb; nails somewhat long and pointed. Head rather long; muzzle pointed; ears of medium size, ovoid. *Upper incisors*: middle teeth simple, pointed, small, and in a vertical position; the following two large, thick, and short, but having a semi-acute point, which has a very backward direction; the following one, or fourth, similar, but very small; the fifth, or canine, separated from the preceding by a considerable interval, small, conical, acute, and nearly vertical in position; the two succeeding teeth nearly similar. *Lower incisors*: middle teeth long, nearly straight, and horizontal in position, as in the Shrews; the four following teeth more or less conical in form, closely packed together, and sloping



HYRACODON [illegible].

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forward, small in size, and evenly diminishing from the first to the last; the fifth tooth has a canine-like form, a little more prominent than the preceding, and curved forward; the sixth small, conical, vertical in position, and widely separated from the fifth.

H. FULIGINOSUS, n. s. (Pl. VIII.)

Tail sparingly covered with short hairs of a dusky colour, throughout the whole of its length, both above and below; upper surface of the feet sparingly covered with hairs similar to those of the tail; ears nearly naked, and of a dark brown colour; fur on all parts of the body of a deep sooty-brown, scarcely paler on the under parts; all the naked parts brown.

	″	‴
Length of the head and body	3	8
——— of the tail	3	8
——— of the head	1	2

Hab. Ecuador; collected by Mr. Fraser.

3. On the Species of Craspedocephalus which occur in the Province of Bahia, Brazil. By Dr. Otho Wucherer, Corr. Memb.

In a former paper, containing the first portion of a list of the Ophidians which I had been able to collect in this province, I abstained from certain remarks on some species of the above genus until I should have collected more ample materials to corroborate them.

In the first place, I was struck by the fact that all the specimens of "Jararaca" which had up to that time come to my notice were very similar and belonged to one species, *Craspedocephalus atrox*. Having collected more than thirty specimens, I proceeded to examine them more closely for comparison. Dr. Gray, in the 'Catalogue of Viperine Snakes in the Brit. Mus.' 1849, comments on the difficulty of separating the species of this genus. His diagnoses do not agree exactly with those of Schlegel in his 'Essai,' nor with those of Duméril and Bibron in their 'Erpétologie Générale,' I may therefore be excused if I offer the following remarks on my specimens. In my former paper I stated that I had neither seen *Craspedocephalus lanceolatus* nor *C. brasiliensis*. At the present time I have examined very nearly forty specimens of "Jararaca," all of which, except three, agree sufficiently in every character, and are, according to the descriptions of herpetologists, referable to *C. atrox*. These three specimens show certain slight differences which justify a doubt of their specific identity with the others.

Dr. Gray mentions *C. atrox* as having seven upper labial shields. Schlegel, in his 'Essai,' i. p. 189, and again ii. p. 535, describes this species as having eight labial shields; still this may perhaps be considered a mistake, for in his plate 19 of the above work *C. atrox* is represented as having only seven upper labial shields. Duméril and

Bibron make no allusion to this character in *C. atrox*. Now all the specimens of *C. atrox* which I have had occasion to examine have seven upper labial shields. Only one has on one side eight, which must be considered an irregularity.

Dr. Gray describes *C. brasiliensis* as having nine or ten upper labial shields, the hinder ones of which are smaller; Schlegel describes it as having nine; and Duméril and Bibron do not mention the number of labial shields at all.

The three specimens differing from those of *C. atrox* mentioned above have all eight upper labial shields on each side, the last one narrower than the last one in *C. atrox*.

A statement I made in my former paper, that my specimens of *C. atrox* differed from those described by herpetologists in having fewer longitudinal rows of scales, I now take the opportunity to rectify. The number of longitudinal rows of scales in the species of this genus is not always mentioned as a specific character, and indeed it does not appear very serviceable as such. Schlegel's *C. jararaca*, the *C. brasiliensis* of Dr. Gray's catalogue, has twenty-seven rows of scales; of *C. atrox* he says (Essai, ii. p. 536), "On compte quelquefois 29 rangées d'écailles," leaving it perhaps hence to be inferred that it has generally a lesser number, or twenty-seven, like the one just described, which is *C. brasiliensis*. Duméril and Bibron (vii. p. 1509 and p. 1511) give to *C. atrox* from twenty-nine to thirty-two, to *C. brasiliensis* twenty-seven rows. All my specimens of *C. atrox*, with few exceptions, have twenty-seven rows of scales, a few having twenty-five. Of the three specimens differing from them, two have twenty-five and one twenty-three rows of scales.

Schlegel, Duméril, and Bibron draw some specific differences from the shape of the head, the former saying (ii. p. 535) that the snout of *C. atrox* is more conical, by which I suppose is meant more rounded, Duméril and Bibron stating that the sharp edge on the anterior part of the head is almost effaced, and does not reach back to the orbits, furthermore that the scales on the anterior part of the head are comparatively much larger than on the posterior part in *C. brasiliensis*; but all these differences do not appear very striking in Schlegel's excellent figures on plate 19 of the 'Essai.' My three specimens distinct from *C. atrox* would rather agree in these points with the descriptions of *C. brasiliensis* of these authors.

Schlegel points to the larger size of the superciliary and superior labial shields in *C. atrox*, to its larger and more numerous mental shields, to the stronger keel on its scales, showing a strong tendency to take the form of a tubercle, by which I understand that it is higher and shorter, not reaching the tip. Now these characters, if they occurred simultaneously, might very well serve as some of the specific characters; and it does not appear just in Duméril and Bibron to say (vii. p. 1508), "M. Schlegel, dans l'embarras où il s'est trouvé, n'a indiqué que des différences peu importantes, tirées de la forme des écailles dont la carène paraît plus forte; des lames noires alongées, ou de l'étendue relative des plaques surciliaires ainsi que les plaques labiales,"—although they confess their inability to suggest

any better characters, and still persist in considering them individuals belonging to two species, having no other basis for their separation than the frequent occurrence of *C. atrox* in Guiana, whilst the other species is never found there.

Comparing my three specimens, which differ from those of *C. atrox* in the last-mentioned respects, and first as regards the size of the superciliary shields, I cannot come to any very precise decision, as they are all not full-grown. Comparing with one another old and young specimens of *C. atrox*, I find that not only the superciliary, but all other head-shields are proportionately larger in young individuals, so is the pit in the cheek; and the whole head is flatter, especially the occiput, and more elongate in adult specimens. I compared the three specimens with those of corresponding size of *C. atrox*, but I could not arrive at any decided opinion; and, considering the difference in size of the figures in Schlegel's plate 19, they also do not allow me to draw any safe inference from the relative size of the superciliary shields in each species. Besides, I am not acquainted with the absolute size each species may attain. As regards the size and number of the mental shields, I cannot find any very striking difference; in some specimens of *C. atrox* I have found one, in others two, and even three pairs of chin-shields; in the three specimens which differ in other respects from them, I always found only one pair. The labial shields are certainly smaller in my three specimens which do not agree with *C. atrox*. But more striking still is the shape of the scales and their keel. The three specimens I am inclined to regard as referable to *C. brasiliensis* have narrower scales, their keel lower, narrower, longer, and reaching to their tip. At first glance these specimens have a less hirsute appearance than those of *C. atrox*. In accordance with the narrowness and the smaller number of their scales, their body appears more slender.

I am well aware that the coloration does not afford safe specific characters, except in comparatively few instances; but as all the specimens I referred to *C. atrox* agree so well in this respect, differing from my three supposed *C. brasilienses*, which again agree among themselves, I may be allowed to state in what one and the other differ. The specimens I refer to *C. atrox* are all greyish yellow or olive, and have along the body irregular brown, black-edged spots with sinuated margins, which occupy about as much space as the ground-colour. In young specimens the colours are generally brighter, and the spots more distinct. Underneath they are all, without exception, chequered with dark grey or black.

The three specimens of supposed *C. brasiliensis* are olive-green; similar brown, black-edged spots, with sinuated margins, occupy their back, but occur at much wider intervals, so that they occupy much less space than the ground-colour; underneath, all three are dirty-yellow, punctulated with black, but not at all chequered.

These differences appear very striking, but I refrain from attaching undue weight to them. Schlegel describes some specimens of *C. brasiliensis* with "larges taches carrées" (Essai, ii. p. 533).

Duméril and Bibron are not explicit as regards the coloration of *C. brasiliensis*.

In Prof. Jan's 'Prodrome d'une iconographie descriptive des Ophidiens,' published in 1859, I find *Trigonocephalus neuwiedi*, which is synonymous with *C. atrox*, enumerated as a distinct species. I also find that Duméril and Bibron consider specimens with a white tip to the tail as a variety; I may therefore be allowed to make the following remarks. Seven of my specimens of *C. atrox* are quite young, their total length ranging from 0·333 to 0·382; in all the tip of the tail is white. Besides these, I have seen many other small specimens, which always showed the same peculiarity. In two specimens of 0·620 and 0·530 total length, which may be considered half-grown, the tip of the tail is lighter-coloured than the rest of the body, showing the transition to the black colour in the tail of adults. From this I think it reasonable to infer that the difference in the colour of the tip of the tail in individuals of *C. atrox* depends on their age, and does not constitute a variety, much less a species. The Brazilians, however, consider small individuals as a distinct species, which they call "Caisacca." Of the young of *C. brasiliensis* Schlegel states expressly (Essai, ii. p. 533), "Les petits offrent le bout de la queue blanc."

The largest of my three supposed specimens of *C. brasiliensis* has a total length of 0·872, and may be considered therefore about half-grown; the tip of its tail is lighter-coloured than the body; underneath to a greater extent, and above at the extreme tip it is quite white. In one of the other two specimens the tip of the tail is lighter-coloured, in the other white.

According to the statement of Schlegel, the iris of *C. brasiliensis* is dark red; he does not mention how the iris of *C. atrox* is coloured. In many live specimens of the latter species which I have seen, I always found it of a dark grey. I never saw a live specimen of a snake corresponding to my supposed specimens of *C. brasiliensis*. In these the colour of the iris is not preserved.

As to *C. lanceolatus*, I very much doubt whether it occurs in Brazil at all.

Trigonocephalus landsbergii, Schl., *Bothrops castelnaudi*, and *Bothrops alternans*, D. & B., have not yet come under my notice.

Of *Craspedocephalus bilineatus* I have seen eight specimens—seven from the vicinity of Villa Vicosa, where the Prince of Wied, who first described the species, found his specimen, and one of unknown origin.

I had previously observed that some Brazilian species of Snakes (as *Spilotes variabilis* and *S. pœcilostoma*, *Coryphodon pantherinus*, *Xenodon colubrinus*, &c.) have the habit of striking the ground rapidly with their tail when irritated; I had lately occasion to notice the same peculiarity in a large specimen of *Craspedocephalus atrox*.

4. On the Ophidians of the Province of Bahia, Brazil. By Dr. Otho Wucherer, Corr. Memb. (Part III.*)

The Dryadidæ which I have here been able to obtain belong to two genera—*Herpetodryas* and *Philodryas*†. The specimens of *Herpetodryas* were in very considerable number, but I am disposed to consider them all belonging to *H. carinatus*. They showed many varieties as regards their scales; some appeared to possess no keels at all, indeed the keel was almost effaced, and barely perceptible, on very close inspection, in a few only of the scales. But these specimens agreed in every other respect so much with undoubted specimens of *H. carinatus* that I could not help considering them specifically the same, and supposing Schlegel was right in not regarding *H. fuscus* as a species. *H. carinatus* is one of the few Snakes possessing the peculiarity pointed out by Reinhardt, that, though they have keeled scales, these have but one groove at the tip. The groove is often very indistinct in *H. carinatus*, and to be found only on some of the scales of the neck.

Of the genus *Philodryas* I have seen two species—*Philodryas reinhardtii* and *P. olfersii*. Of these, the former is by far the most common in our neighbourhood. Soon after my attention was drawn to the small grooves on the scales, I found that all my specimens of *P. viridissimus* had but one groove on each scale. I therefore thought Reinhardt was wrong in stating this Snake to have two grooves, until Dr. Günther showed that there were two species comprehended under the name *P. viridissimus*, to the one of which with two grooves he has left the name *viridissimus* (Surinam), establishing the other with one groove as a new species—*P. reinhardtii* (Brazil).

Of *P. olfersii* I have seen about half-a-dozen specimens. One was sent to me lately from Rio de Janeiro, the rest were from this province.

Of the family Dendrophidæ a single species, *Ahætulla liocerca*, has come to my notice, but in few specimens. One was sent to me from Rio de Janeiro; when alive, it is a very beautiful animal.

The family of Dryiophidæ is represented in this province by two species of the genus *Dryiophis*—*D. argentea* and *D. acuminata*, of which the former seems to be very scarce, whereas the latter is exceedingly common. I have nothing to add to what is already known of these animals. I have repeatedly tried to keep live specimens in confinement, but they all soon perished, after incessant disquietude, without ever taking food of any kind.

The Brazilian Dipsadidæ are all, as far as I have been able to ascertain, of nocturnal habits. During the day, specimens are found only in dark, sheltered places; at night they are frequently met with abroad. A specimen of *Leptodeira annulata*, which I kept for a long time in confinement, was never visible during the day, being hid in a crevice of its cage, but soon after sunset it became very lively. I never saw it take any food; and it died after several

* See P. Z. S. 1861, pp. 113, 322.

† [To these we may now add the genus *Dromicus*; see page 56.—A. G.]

months' confinement, probably from inanition. This species is very frequently found close to dwellings and in the thatch of houses.

Of *Thamnodynastes nattereri* I have obtained a great many specimens; but of *T. punctatissimus* only a few from Cañavieras.

My statement to Dr. Günther that I had seen a specimen of *Eudipsas leucocephalus* was founded on a mistake; no specimen of this species has yet come to my notice.

Leptognathus catesbyi is not very scarce. Of *L. mikanii* I have only lately received specimens from Caravellas.

The Brazilian species belonging to the family Scytalidæ are numerous. Of *Scytale coronatum* I have seen only the variety B. of Dr. Günther's Catalogue. It is exceedingly common, and very remarkable for the different changes of coloration it undergoes by age. Young specimens are of a pale-pink colour; adults are of an almost uniform black colour above, and white beneath. It lives, like all the members of this family, on lizards, chiefly on our most common species, *Trachycyclus marmoratus*. I have frequently had specimens of *Scytale* and *Oxyrhopus* alive for months; they are all of seminocturnal habits, and pursue their prey, not during the night, but at beginning of dusk, or a short time before sunset. On seizing they seldom crush their victims, unless these offer strong resistance; and considering how vigorous and tenacious of life lizards are, I have often been surprised at the little resistance they offer when caught even only by a leg. They seem paralyzed. If they struggle, the snake quickly throws a coil or two over them; if not, they allow their pursuer, after a little while, to relinquish its hold and to seize them deliberately by the head. Is it that the Snakes with grooved teeth are, after all, not quite innocuous, at least for cold-blooded animals? I was once severely bitten by a *Philodryas reinhardtii* without feeling the slightest subsequent inconvenience.

Of the genus *Oxyrhopus* I have seen the following species:—*O. clœlia*, *O. formosus*, *O. petolarius*, *O. immaculatus*, and *O. trigeminus*. The last-named one and *O. petolarius* are the most common. Of *O. immaculatus* I have seen a single specimen.

Of the family Elapidæ two species are very common—*Elaps lemniscatus* and *E. corallinus*. The variety of the latter with white-edged black rings never attains but a small size; it differs also in coloration from the others, being brick-red. I am therefore inclined to consider it as a distinct species—the *E. circinalis* of Dum. and Bibron.

5. Addition to Dr. Wucherer's Article on the Ophidians of Bahia. By Dr. A. Günther, F.Z.S., etc.

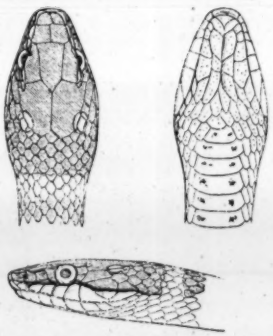
Almost simultaneously with the concluding part of Dr. Wucherer's paper "On the Ophidians of Bahia," I received from him a small Snake, which on examination proved to be a new species of the genus *Dromicus*.

Mr. Cope has lately* pointed out the complete gradation existing

* Proc. Acad. Nat. Sc. Philad. 1862, p. 75.

between the most slender species of *Dromicus* and the stout forms of the genus *Liophis*, dividing them into six divisions, characterized by the structure of the scales and by the relative length of the tail*. This new species would enter the division *Lygophis* of his arrangement, having the scales without grooves, and a tail the length of which is one-fourth of the total.

DROMICUS (LYGOPHIS) WUCHERERI, sp. nov.



Scales in fifteen rows. Loreal square; one præorbital, reaching to the upper surface of the head, but not touching the vertical; two postorbitals; eight upper labials, the third, fourth, and fifth entering the orbit (the third with its posterior angle only); the seventh labial forms only a small portion of the lip, and on one side it is even somewhat remote from the labial edge, the sixth and eighth labials being in contact with each other (as in *Diemennia*, where this shield generally is described as a temporal). An elongate temporal shield is in contact with both oculars; five scale-like temporals behind, in two transverse series. Five pairs of the lower labials are in contact with the chin-shields. 160 ventral shields; anal bifid; 66 subcaudals.

The posterior maxillary tooth is the strongest, and somewhat remote from the preceding.

Light brownish olive, minutely dotted with brown. Anterior part of the trunk with twelve pairs of brown spots, which are arranged in a zigzag series; the spots of the two anterior pairs are confluent.

* Mr. Cope's general observations on the species of these genera are perfectly correct, and the divisions proposed by him are most convenient for the determination of the species, but they do not appear to me to be more natural groups than those which we had before; for instance, *Liophis reginæ* is certainly more closely allied to *L. merremii* and to *L. cobella* than to *Dromicus temminckii*; yet *L. reginæ* and *D. temminckii* are united into one group, and the two others into another. *L. conirostris* cannot be separated from *L. reginæ*. And if *Liophis* and *Dromicus* be brought into so close a proximity as they are by Mr. Cope, *Zamenis* and certain species of *Coronella*, *Leptodira*, &c., cannot be kept at a distance.

Head brown, with a pair of rounded, well-defined, yellowish spots; a yellow line from above the eye, along the canthus rostralis, round the snout; upper lip yellow, separated from the brown colour by a black line; anterior ventral shields with an irregular series of black dots on each side; belly yellow.

The typical specimen is an adult male, 16 inches long. I name the species after my friend Dr. O. Wucherer of Bahia, its discoverer, who informs me that he has seen only three specimens of it, alike in size and colour. The species, therefore, appears to be scarce.

6. Contribution to the Herpetology of Ceram. By Dr. A. Günther.

We are indebted to our knowledge of the reptiles of Ceram to Dr. P. v. Bleeker, who, in a paper, "Over de Reptilien-Fauna van Ceram"*, enumerates thirty-eight species collected at Wahaai, on the northern coast of that island, and at Paulohi on the southern coast.

Having received a small collection of these animals from North Ceram, I am enabled to add the following species:—*Tiliqua rufescens*; *Cyclodus carinatus*, n. sp.; *Coluber holochrous*, n. sp.; *Fordonia unicolor*, Gray; *Cerberus acutus*, Gray; and *Diemennia mülleri*, Schleg. However, it is probable that three of these species are comprised in Bleeker's list, but under different names, viz., *Cyclodus carinatus*, mihi, as *C. boddaërtii*, D. & B.; *Fordonia unicolor*, Gray, as *Eurostus plumbeus*, D. & B.; and *Cerberus acutus*, Gray, as *Cerb. boæformis*, D. & B. Therefore, taking the number of Ceramese reptiles known as forty-one, we find that thirty-five of them are referable to the fauna of the Indian Archipelago, whilst the remaining six belong to genera which have hitherto been considered as peculiar to the Australian region. Those six are *Cyclodus*, *Liasis*, *Enygrus*, *Acanthophis*, *Diemennia*, and *Pelodryas* (*Hyla cyanea*).

Dipsas irregularis appears to be one of the most common Snakes in Ceram. One large specimen had swallowed the egg of a bird, probably that of a middle-sized parrot; it was but slightly cracked on one end. This Snake has no œsophageal teeth.

Fordonia unicolor feeds on freshwater crabs.

Enygrus carinatus has twenty-seven series of scales. Schlegel has counted thirty-three.

Acanthophis cerastinus.—The specimens from Ceram differ from those of the Australian continent in the coloration. They are light reddish olive, with indistinct darker cross-bands in young age; a series of black dots runs along each side of the front part of the belly and of the tail. The other markings of the head are the same as in Australian specimens; and as there is no other difference in the form, in the shields, or scales, I consider it merely as a variety, for which I propose the name of *ceramensis*.

* Nat. Tydschr. Nederl. Ind. 1860.

The two following species appear to be new:—

CYCLODUS CARINATUS.

Similar to *C. gigas*, and with the same elongate temporal shields; but the scales are larger, there being thirty-two in a series round the body, and fifty in a longitudinal row between the axils of the fore and hind limbs*. The median scales along the back are very distinctly keeled, the keels forming slight longitudinal ridges along the back of the tail.

Brownish olive, with about ten narrow black bands across the back of the trunk; sides and belly marbled with black; limbs black.

Total length 18 inches, of which the tail measures 8 inches.

COLUBER HOLOCHROUS.

Scales smooth, without groove, in seventeen rows. Seven upper labials; two anterior and two posterior oculars. Uniform brownish grey; belly and the outer series of scales dull yellowish.





Body and tail moderately elongate, but slightly compressed. Rostral shield broader than high, scarcely reaching to the upper surface of the head; anterior frontals not quite half as large as the posterior; vertical pentagonal, as broad as long, the lateral edges being shorter than the anterior. Occipital shields moderate, slightly notched behind. Nostrils wide, the suture between the two nasals being very indistinct. Loreal large, longer than high; two anterior and two posterior oculars, the upper anteocular not being in contact with the vertical. Seven upper labials, the third and fourth coming into the orbit. Eight temporal shields in three transverse series; the two anterior temporals are somewhat elongate, and the upper of them is in contact with both postoculars, the others are scale-like. Eight lower labials, five of which are in contact with the chin-shields. Ventral shields 206; anal entire; subcaudals eighty-seven. There

* *Cyclodus gigas*, from New Holland, has thirty-six series of scales round the body, and fifty-seven or sixty between the fore and hind limbs.

are six or seven rather strong teeth in each maxillary, and ten in each mandible. Eye rather small, two-fifths of the length of the snout.

Total length 43 inches.

If we divide the *Colubri* with equal or subequal teeth into the subgeneric divisions of *Coluber*, *Elaphis*, *Cynophis*, *Spilotes*, and *Coryphodon*, as indicated in my 'Catalogue of Colubrine Snakes,' p. 84, the present species does not enter any of these sections; and we may propose the name of *Lielaphis* for a sixth group, of which *C. holochrous* is the type, and to which also *Spilotes samarensis*, Peters, belongs. Its characters would be:—Rostral moderate; body and tail rather elongate and compressed; two anterior and two posterior oculars. Scales smooth. Teeth subequal, in small number.

7. Note on some Freshwater Shells sent from Madagascar by J. Caldwell, Esq. By the Rev. H. B. Tristram, Corr. Memb.

A small parcel of freshwater shells sent by Mr. Caldwell from Madagascar, and entrusted to me for examination by Dr. Sclater, contains examples of six species, four of which appear to be hitherto undescribed.

1. Pirena spinosa, Reeve. Subgenus *Melanatria* of Bowdich. Found at Renomafana, Madagascar.

2. Ampullaria adusta, Reeve.
——— *sordida*, Sowerby, iii. pl. 143.

Given by Reeve without locality, but conjectured to be from Borneo; Renomafana, Madagascar.

3. Physa (subgenus *Ameria*, H. Adams) lirata, n. sp.



Testa truncato-ovata, brevis, tenuis, fusca; spira omnino truncata; anfractus 3, *liris continuis valde et conferte ornati modo testæ* Harpæ; *sutura profunda; apertura subovalis, intus lirata, infra expansa; peritrema continuum; plica columellaris conspicua.*

Shell truncate-ovate, short, fragile, brown; spire quite truncated; whorls three, strongly and thickly ornamented with continuous ridges, like the harp-shell; suture deep; aperture subovate, lirated on its inner fold, and expanded below; peristome continuous, columellar fold distinct.

Long. 4¼ lin.; diam. 3¼ lin.

Hab. Two days west of Antananarivo, Madagascar.

This shell, while by its flattened spire and angulated posterior

whorl it approaches the Australian group *Ameria* of H. Adams, yet, from its singular lirate character, may probably itself prove the type of a peculiar subgenus.

4. LIMNÆA (Drap.) HOVARUM, nov. spec.

Testa imperforata, ovato-globosa, tenuissima, pellucida, nitidissima, longitudinaliter subtilissime striata; sutura simplex; spira depressa, apice acuto; anfract. 3½, convexi, ultimus ⅘ longitudinis subæquans; apertura obliqua, ovato-globosa; peristomium rectum, simplex, margine columellari reflexo, marginibus callo tenui junctis.

Shell imperforate, ovately globose, very thin, transparent, very glossy, very slightly striated lengthways; the suture plain; the spire depressed, with a sharp apex; 3½ whorls, convex, the last occupying four-fifths of the length of the shell; the aperture oblique, ovately globose; the peristome straight and simple; the columellar fold reflected, its edges joined by a thin skin.

Long. 5½ lin.; lat. 3½; apert. long. 4½; lat. 3.

Hab. Two days west of Antananarivo, Madagascar.

5. PLANORBIS (subgen. *Nautilina*, Stein) CALDWELLI, n. sp.

Testa discoidea, albido-cornea, nec striata, nitida, hispidula, supra forte convexa, umbilicata, subtus plana, paulo foveolata; anfract. 4–5, supra convexi, ultimus acute carinatus; apertura obliqua, sublunaris; peristomium rectum.

Shell disc-shaped, horny white, not striated, shining, rather rough, strongly convex above, umbilicated, flat below, and slightly pitted; four to five whorls, convex above, the last sharply keeled; the aperture oblique and crescent-shaped; the peristome straight.

Diam. maj. 2¾ lin.; min. 2; alt. apert. ¾ lin.

Hab. Two days west of Antananarivo, Madagascar.

The nearest congener of this species is an unnamed species from Natal, in Mus. Cuming.

6. CYCLAS (*Sphærium*, Scop.) MADAGASCARIENSIS, nov. spec.

Testa suborbicularis, subinæquilateralis, ventricosa, tumida, ad margin. paulo compressa, irregulariter concentrice striata, rubigine radiata, olivaceo-fusca, zonis pallidioribis interspersis, margine dorsali utrinque compresso et expanso; natibus acutis, integris, proximis, natreo resplendentibus, valde prominentibus; ligamento subinfosso.

Shell suborbicular, slightly inequilateral, ventricose, tumid, slightly compressed towards the edges; irregularly striated concentrically, and faintly radiated with rust-colour; olive-brown, interspersed with paler zones; the dorsal margin compressed and expanded on both sides; the umbones sharp, perfect, close together, with a natreous lustre, very prominent; the ligaments buried.

Long. 4½ lin.; lat. 3½; alt. 2½.

Hab. Two days west of Antananarivo, Madagascar.

February 10, 1863.

W. H. Flower, Esq., F.Z.S., in the Chair.

Mr. R. Swinhoe exhibited some new and remarkable species of birds collected by himself in the Island of Formosa.

The following papers were read:—

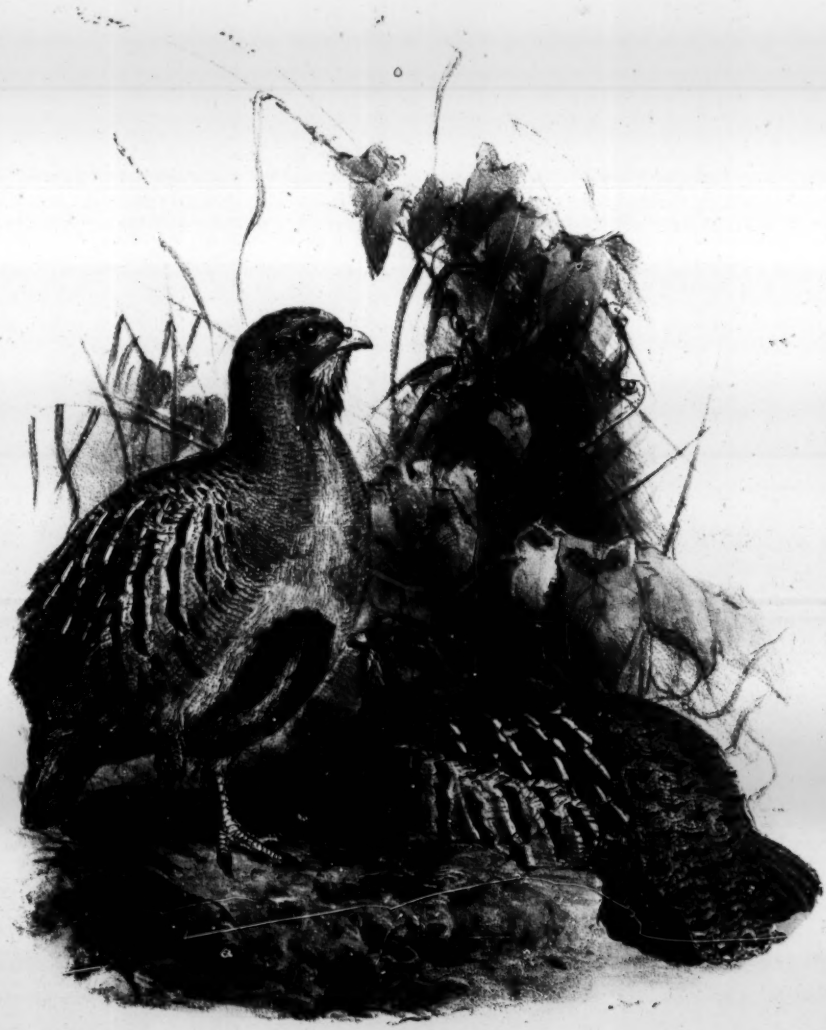
1. DESCRIPTION D'UNE NOUVELLE ESPÈCE DE PERDRIX. PAR MM. J. VERREAUX ET O. DESMURS.

(Plate IX.)

PERDIX BARBATA.

P. PERDICI cinereæ *assimilis, sed magis rufescens; macula frontali, suboculari, et plaga pectorali media nigris; plumis gutturalibus elongatis, lanceolatis, utrinque lateraliter expansis; tarsis rufescentibus.*

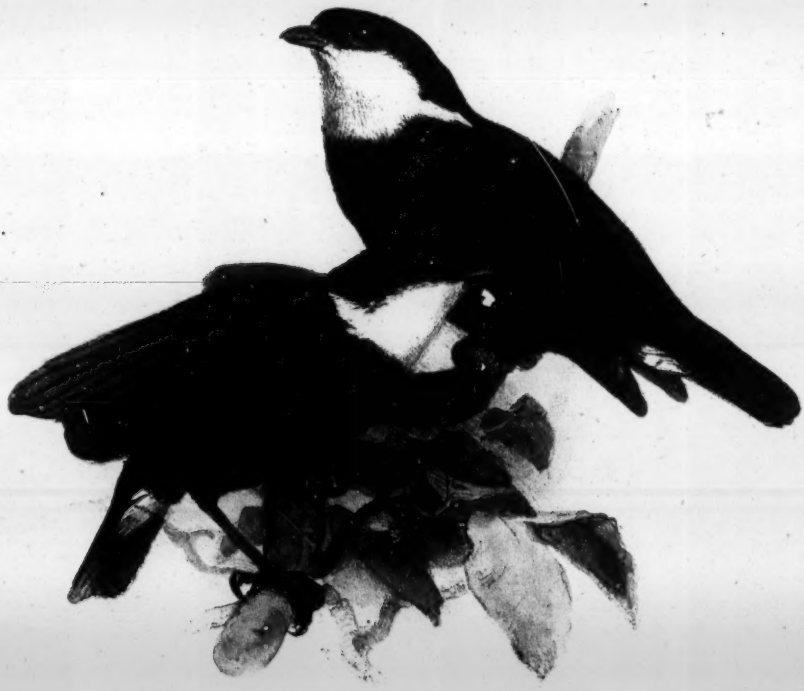
Mâle adulte. Vertex, occiput et milieu de la nuque d'un brun foncé, varié de roussâtre, avec des flammèches ou stries blanchâtres occupant le centre de chaque plume, et allant en s'élargissant vers le bout; front, face demi-cerise arrivant vers l'occiput, gorge et devant du cou d'un roux-clair, plus vif sur les plumes du centre du cou, ainsi que sur sa large plaque pectorale, au centre de laquelle se trouve une autre grande tache noire; une très-petite tache noire se trouve en avant du front; une autre, au-dessous de l'œil, semble longer la partie supérieure des plumes des oreilles, qui ont une teinte brune variée de roussâtre, et dont les plus longues portent des flammèches blanchâtres. Les plumes de la gorge sont longues et étroites, et les latérales, beaucoup plus longues, forment une barbe qui a quelque analogie avec celle de l'*Otis tarda*. Cou et poitrine et parties latérales du ventre gris-clair, fortement vermiculées sur les deux dernières parties; flancs blanchâtres, avec des bandes obliques plus ou moins larges d'un roux-foncé; cuisses et bas-ventre d'un blanc légèrement grisâtre; couvertures sous-caudales roussâtre-claires, légèrement vemiculées de brun, surtout vers le centre, quelques taches noirâtres à l'extrémité des plus longues; haut du dos gris, finement vermiculé comme la poitrine, et légèrement zoné de brun-roux foncé et de roussâtre-clair. La même distribution règne sur le reste de la partie supérieure; mais elle a une teinte générale plus rousse, excepté sur les couvertures sus-caudales, qui sont très-longues, et où la couleur est plus claire; les bandes transversales brunes, ou brun-roussâtres, sont très-larges vers leur extrémité, et paraissent encadrées de blanchâtre. Ailes d'un cendré brun, avec de nombreux zigzags de même couleur, et des bandes ou taches rousses, et des taches longitudinales blanches au centre; rémiges brunes, avec des taches et des bandes blanchâtres. Les sept rectrices latérales roux-claires, avec un ruban plus foncé vers le bout, qui porte une tache blanche, surmontée même d'une tache plus ou moins bien marquée de noirâtre, les médianes se



J. Wolf, del et lith.

M & N Hanhart, Imp.

PERDIX BARBATA.



J. Wolf, del et lith.

M & N. Hanhart, Imp.

PIPRA LEUCORRHOA.

confondent avec les couvertures. Bec plombé, plus clair vers le bout ; tarses rougeâtres.

	Centim.	Millim.
Longueur totale	30	0
——— de l'aile fermée	16	0
——— de la queue.....	7½	0
——— du bec, en suivant la courbure	0	14
——— du tarse	4	0

Cette description a été prise sur un sujet mâle très-adulte, provenant de la Dahourie centrale, à laquelle l'espèce paraît exclusivement confinée, puisqu'elle manque dans la partie septentrionale de cette province qui est baisée, ainsi que dans la partie méridionale qui est aride (celle des steppes sans eaux) ; elle se rencontre aux environs de la ville de Nertschinsk, et dans tout le pays des Mines de Nertschinski-zawod. Elle se tient de préférence dans les champs cultivés et dans les broussailles ; pendant l'hiver elle descend dans les prairies, près des ruisseaux et quelquefois près des habitations. Sa voix et son vol sont les mêmes que ceux de la *Perdix cinerea*, dont elle est facile à distinguer par le noir du front et du dessous de l'œil, et par la large plaque de même couleur qui occupe le centre du ventre, par la teinte rousse de la partie antérieure, par les longues plumes de la gorge et par les tarses rougeâtres. Sa taille est enfin plus petite que celle de la *P. cinerea*.

C'est à l'obligeance de notre savant ami et collègue M. Taczanowski, de Varsovie, que la science est redevable de la connaissance de cette intéressante espèce et des détails qui précèdent. Ceux-ci lui ont été confirmés par M. Watecki, qui a eu fréquemment occasion d'observer et de chasser cette espèce.

Nous espérons être bientôt assez heureux pour en faire connaître la femelle qui nous a été promise par M. Taczanowski.

2. On a New Species of the Genus Pipra, from New Granada. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

(Plate X.)

M. Verreaux, of Paris, has lately sent me a skin of a Manikin from New Granada closely allied to *Pipra gutturalis* of Cayenne, but easily distinguishable by the smaller size of the gular white, the white crissum, and the entire absence of the white markings in the primaries which are so characteristic of *Pipra gutturalis*. For this new species I propose the name *Pipra leucorrhoa*, with the following characters.

Pipra leucorrhoa, sp. nov. (Pl. X.)

Splendenti-nigerrima, gutture et lateribus cervicis et crissi plumarum apicibus albis ; primariis intus cinereis ; rostro plumbeo, subtus albicante, pedibus carneis.

Long. tota 3·3 ; alæ 2·2 ; caudæ 1·2 poll. Angl. et dec.

Hab. In Nova Granada int.

Obs. Similis *Pipræ gutturali*, sed gutture circumscripte albo, crisso albo terminato et primariis intus cineraceis facile distinguenda.

I should add that the first primary in the single specimen that I possess of this bird is remarkably diminutive, measuring only 0·6 inch from the insertion to the extremity, and being very much narrowed. The second, third, and fourth primaries are also much narrowed towards their terminations. My belief is that this is an abnormal formation peculiar to the male bird, somewhat analogous to that which I have described in *Machæropterus* * ; but before stating this as a certainty, I should wish to see more specimens of the species, as, without spoiling the skin, it is difficult to be quite certain whether the first primaries are fully grown or not.

3. A List of Diurnal Lepidoptera taken in Madagascar by Mr. Caldwell. By W. C. Hewitson, F.Z.S.

(Plate XI.)

A small collection of Diurnal Lepidoptera from Madagascar, which has been sent to me for examination by Dr. Sclater, is stated to have been formed by Mr. J. Caldwell chiefly in the neighbourhood of Antananarivo, except the *Diadema dexithea*, which was captured near Beforona, just before entering the great forest of Alamazaotra. It contains the following species:—

Papilio demoleus.

A common African species.

Papilio oribazus, Boisduval, Spécies Général des Lépidoptères, p. 223.

A very rare species, the only examples of it sent to Europe up to the present time being two specimens in the collection of Dr. Boisduval of Paris. The males of the nearly allied species *P. nireus* (of which *P. erinus* of G. R. Gray is only a variety), *P. phorbanta*, and *P. disparilis* have each on the underside of the posterior wing a submarginal band of silvery white spots, whilst this species, which is without these said spots, closely resembles their females, and in this respect is most nearly allied to *P. charopus* of Westwood.

Pieris phileris, Boisduval, Faune Entom. de Madagascar, pl. 2. f. 3, 4, 5.

Pieris mesentina, Cramer, pl. 270.

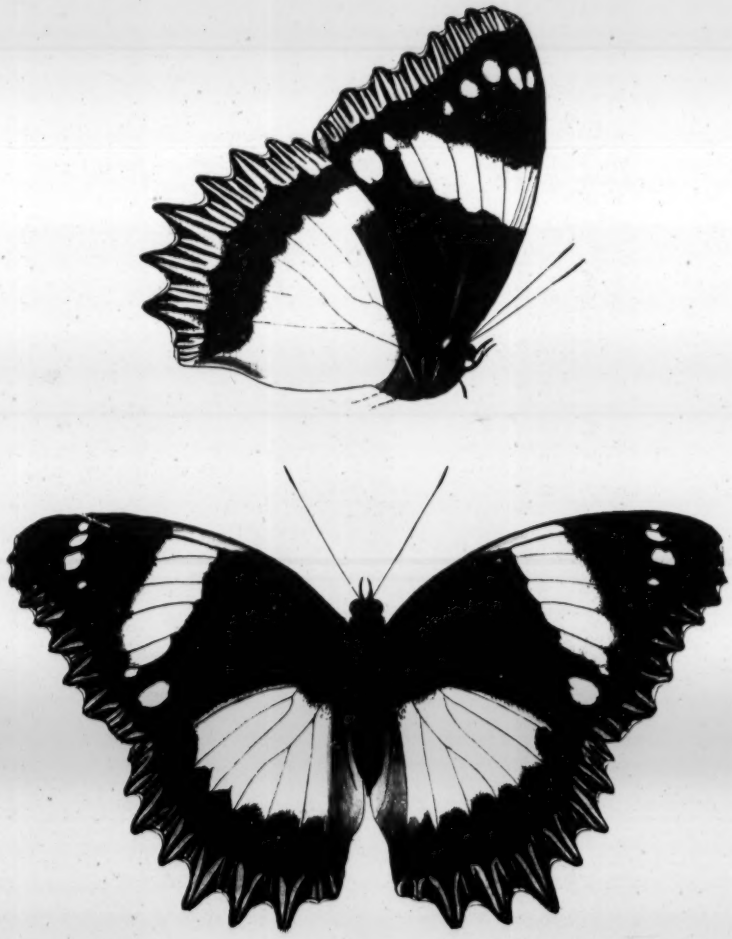
A species common to Africa and India as well.

Acræa rakeli, Boisduval, Faune Ent. Madagas., pl. 5. f. 1, 2.

Acræa zitja, Boisd. Faune Ent. Mad., pl. 4. f. 4, 5.

Acræa serena, Godart.

* See P. Z. S., 1860, p. 90; and Ibis, 1862, p. 175.



W.C.Hewitson, del et lith 1863.

M & N Hanhart, Imp.

DIADEMA DEXITHEA.

BRITISH
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ACRÆA OBEIRA, Hewitson.

Alis diaphanis; anticis basi rufo, apice fusco; posticis dimidio basali rufo, maculis quindecim nigris, margine exteriore fusco.

Upperside transparent, glossy. Anterior wing with the base rufous, the apex brown. Posterior wing rufous from the base to beyond the middle, marked with fifteen black spots; five at the base, two before the middle, followed at the middle by a curved band of eight larger spots, two of which in the middle of the band touch each other, the outer margin brown.

Underside as above, except that the margins are much paler and the rufous portion of the posterior wing nearly white.

I have adopted the name by which Dr. Boisduval has proposed to call this species.

VANESSA CARDUI, Linnæus.

JUNONIA RHADAMA, Boisduval, Faune Ent. de Madagascar, pl. 7. f. 2.

DIADEMA DEXITHEA, Hewitson. (Pl. XI.)

Alis dentatis, lunulis marginalibus albis; anticis nigris, in medio fascia obliqua lata maculisque quatuor apicalibus albis; posticis dimidio basali albo; pone medium fascia transversali rubra; margine exteriore nigro.

Upperside black: the wings dentated, the outer margins with lunules and lines of grey-white. Anterior wing crossed obliquely at the middle by a broad equal band of white, with between it and the anal angle two spots (one minute touching the band) of the same colour; a band of four small white spots near the apex. Posterior wing with the basal half cream-colour, bordered below with a band of brick-red; the base, the costal, and outer margins black.

Underside as above, except in colour; the black of the upperside is below brick-red. The anterior wing has the inner margin broadly black. The costal margin of the posterior wing is interrupted by a white spot.

In its general appearance this species most nearly resembles the female of *D. lasinassa*; in the arrangement of the nervures it agrees with *D. dubia* and *D. anthedon*. The cell of the anterior wing is open; the cell of the posterior wing is closed.

For the great pleasure of possessing and making known this most valuable and remarkable addition to the diurnal *Lepidoptera* I am indebted to the kindness of Dr. Sclater. The rich collection of Dr. Boisduval contains the only other example which has, I believe, yet reached Europe.

EREBIA TAMATAVÆ.

Satyrus tamatavæ, Boisd. Faune Ent. de Madagascar, pl. 8. f. 6, 7.

4. Descriptions of some New Species of Shells, collected at Vancouver Island and in British Columbia by J. K. Lord, Esq., Naturalist to the British North-American Boundary Commission, in the years 1858–1862. By W. Baird, M.D., F.L.S.

1. Chrysodomus tabulatus, Baird.

Ch. *testa fusiformi, aspera, confertim lirata, liris inæqualibus, minute squamatis; anfractibus sex seu septem, superne concavo-angulatis seu canaliculatis, ultimo magno, trientes duos longitudinis testæ adequante, et antrorsum in canalem flexuosum desinente, suturis distinctis; labro interno super columellam inflecto, umbilicum tegente.*

Long. 3 inches; lat. $1\frac{1}{3}$ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

Only one specimen of this species was collected, and it had for some time been the abode of a hermit-crab. It is of a perfectly fusiform shape, and the upper parts of the whirls next to the suture are flattened and hollowed out into broad channels. The surface is encircled with numerous, close-set, raised striæ, which are of unequal size, every fourth one being larger than any of the intermediate ones, and all roughened by numerous small scales. The whirls are six or seven in number (the upper ones being unfortunately broken off), and rapidly increase in size, the last being two-thirds the length of the whole shell. The columella is covered with a turned-over plate of the inner lip, the umbilicus being partially concealed by it. The lower canal is of considerable length, and is bent to one side. The mouth appears to be rather small in proportion to the size of the shell. When taken, it was inhabited by a species of *Pagurus*, and, as is customary with shells similarly inhabited, was considerably injured by its parasitic tenant.

2. Vitularia aspera, Baird.

Vit. *testa fusiformi, purpurea, scabra, elongata, longitudinaliter plicato-costata, transversim lirata, liris crebris et minutissime squamatis; anfractibus sex, ultimo trientes duos longitudinis testæ adequante, in canalem rectum, longiusculum, apertum, desinente; columella planulata, fauce albida; labro externo intus dentato, extus serrato; operculo oblongo, nucleo in margine externo sito.*

Long. 1 inch; lat. $\frac{1}{2}$ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

This shell partakes much of the character of a species of *Murex*; but the oblong operculum, with its nucleus situated on the external edge towards the middle, places it among the *Buccinidæ*. It is of a purple colour; and the surface of the shell is rough, with numerous small scales on the raised striæ which encircle it. The longitudinal plaits or varices are about ten in number, and are least distinct on the last whirl. The mouth is ovate, and the canal of moderate length and straight.

3. Chemnitzia vancouverensis, Baird.

Ch. *testa elongato-turrita, cylindrica, longitudinaliter oblique forte costata; anfractibus novem, ultimo superne indistincte costato, infra lævigato; apertura parva, rotundato-ovata; suturis impressis.*

Long. ¼ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

"Taken from the crop of a Pin-tail Duck."—*J. K. Lord.*

This shell is peculiarly ribbed. The eight upper whirls are strongly and somewhat obliquely ribbed; but on the last, which is the largest, the ribs are indistinct on the upper half, and on the lower half disappear altogether. The interstices between the ribs, which in the penultimate whirl are about sixteen in number, appear smooth. The sutures are deep and well marked. The mouth is rather small, and is somewhat rounded-ovate. In consequence of its having been in the crop of a duck, the surface of the shell is somewhat eroded, and the apex is broken off.

4. Amnicola hindsii, Baird.

Am. *testa retusa, solidula, viridi-olivacea, minute longitudinaliter undulato-striata, transversim obscure lirata, apice erosa; anfractibus quatuor, ultimo prope medium retuse-carinato, ad suturas canaliculato, suturis impressis; columella albida; apertura cærulescente.*

Long., largest specimens, nearly ½ inch; lat. rather more than ⅓ inch.

Hab. River Kootanie, and stream at the foot of the Rocky Mountains, British Columbia. (*Mus. Brit.*)

This species resembles somewhat the *Paludina seminalis* of Hinds, but it differs in contour, being bluntly carinate round the middle of the last whirl, and in being channeled round the suture. The surface of the shell is distinctly marked with numerous flexuous striæ, the lines of growth, and near the sutures is rather indistinctly marked with circular striæ. I have named it after a good conchologist, who has described several shells from the West Coast of America, and who obtained the specimens of his shell from the Rio Sacramento, California.

5. Bullina (Tornatina) eximia, Baird.

B. *testa cylindracea, viridi-lutescente, striata; striis minutis, confertis, undulatis; spira concava, excavata; apertura longa, ad basin effusa; labro acuto, columella prope basin subito arcuata.*

Long. ½ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

Two or three specimens of this pretty species of *Bullina* were dredged, with the animals alive, in 12 fathoms water; and several others were taken out of the stomach of a Pin-tail Duck shot in the harbour. The shell is cylindrical, and minutely striated with numerous flexuous lines. The spire is very short and concavely excavated;

while the aperture is of considerable length, and the columella at the base suddenly arched.

6. SUCCINEA HAWKINSII, Baird.

S. *testa elongato-obovata, tenui, pellucida, nitida, undulato-striata, rubella, intus margaritacea, spira acuta; anfractibus quatuor, convexis, ultimo duos trientes longitudinis testæ adequante, sutura impressa, apertura ovali, inferne effusa.*

Long. $\frac{3}{4}$ inch; lat. $\frac{1}{3}$ inch.

Hab. Lake Osoyoos, British Columbia. (*Mus. Brit.*)

This shell is of an elegant form, and of a pinkish colour, with the interior of a pearly lustre. It is smooth and shining, but marked with waved striæ of lines of growth. It resembles very much in figure the *Succinea pfeifferi* of Europe, but is of a still more elegant shape, and of a brighter hue.

I have named it after Lieut.-Col. Hawkins, R.E., Commissioner of the British North-American Boundary Commission.

7. LIMNÆA SUMASSII, Baird.

L. *testa elongata, attenuata, cornea, fragili; anfractibus sex, ultimo cæteris duplo majore; apertura mediocri; columella forte plicata; superficie externa, sub lente, creberrime et minutissime decussata.*

Long., largest, $1\frac{1}{6}$ inch; lat. $\frac{1}{2}$ inch.

Hab. Sumass Prairie, Fraser River, British Columbia. (*Mus. Brit.*)

This species of *Limnæa* approaches *L. elodes* of Say, but is more elongated, more fragile, and has the columella very strongly plicated. The surface of the shell, when seen under a lens of moderate power, is finely decussately striated. It is of a horny colour, and is of an elongated shape.

8. PHYSA LORDI, Baird.

Ph. *testa tenui, majuscula, cornea, tumida, gibbosa, apertura magna; labro acuto, linea alba seu fusca externe notato; superficie externa minutissime decussata; anfractibus sex, duobus primis minutis, nigro tinctis, ultimo tumido, cæteris quadruplo majore.*

Long. from $\frac{3}{4}$ to 1 inch; lat. from $\frac{1}{2}$ to $\frac{3}{4}$ inch.

Hab. Lake Osoyoos, British Columbia. (*Mus. Brit.*)

This species is one of the largest of the genus, and is much swollen and gibbous. The outer lip is generally marked with a streak of brown edged with white, which mark is left in those specimens which are of older growth, leaving a white callous-looking line of growth edged with brown, nearly in the centre of the last whirl, which is very large, being about four times the size of all the others put together. The two upper whirls, which are very small, are of a black colour. The surface of the shell is finely decussately striated.

The *Physa heterostropha* of Say abounds in the Sumass Prairie, on the Fraser River; but its place seems to be taken on the higher ground towards the Rocky Mountains by the *Ph. lordi*.

9. Ancylus kootaniensis, Baird.

A. *testa ovata, cinerea, concentrice striata, vertice antico, obtuso; intus nitida.*

Long. ¼ inch; lat. ¼ inch.

Hab. Rivers Kootanie and Spokane, British Columbia. (*Mus. Brit.*)

The shell is of an ovate form, and is concentrically striated, though the striæ only appear on the lower two-thirds of its surface, the apex being smooth and shining. Internally the shell is shining and somewhat pearly.

10. Chione lordi, Baird.

Ch. *testa minuta, ovato-trigona, nitida, concentrice transversim sulculata, umbonibus prominulis, nitidissimis, lunula nulla, extus lutescente seu albidi-olivacea, intus alba, marginibus tenuissime crenulatis; sinu pallii brevi, obtusa.*

Long. nearly ¼ inch; lat. rather less than ¼ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

This shell was taken in considerable numbers from the crop of a Pin-tail Duck, shot in the Harbour of Esquimalt, Vancouver Island, November 23rd, 1858.

It is a small species, of an ovate-triangular shape, a smooth shining appearance, and a light olive colour. The surface is concentrically marked with slight grooves. The beaks are prominent and very shining. Internally the surface is white, the margins of the shell very finely crenulate, and the pallial impression short and blunt.

11. Sphærium (Cyclas) tumidum, Baird.

Sph. *testa ovato-trigona, tumida, olivacea, conferte transversim concentrice forte costata; umbonibus prominentibus, necnon erosis; interne cærulescente; margine ventrali rotundato.*

Long. ½ inch; lat. rather more than ½ inch.

Hab. Sumass Prairie, Fraser River, British Columbia. (*Mus. Brit.*)

This shell is of a tumid, swollen figure, and of an ovate-trigonal shape. The colour externally is dark olive, and it is strongly ribbed concentrically. The beaks are prominent, and frequently eroded. The inner surface is of a bluish tint. The ventral or lower margin is rounded.

12. Sphærium (Cyclas) spokani, Baird.

Sph. *testa rotundato-ovata, cornea, concentrice transversim conferte minute striata, nitida, sub lente obsolete punctata; umbonibus rotundatis, obtusis; interne albida; margine ventrali rotundato.*

Long. rather less than ½ inch; lat. rather more than ½ inch.

Hab. Rivers Spokane and Kootanie, British Columbia. (*Mus. Brit.*)

This shell is smaller than the preceding, more rounded, and with more obtuse beaks. The striæ or riblets are much less distinct; the colour is pale horny externally, and white internally. It has a shining appearance; but when examined by the lens, the surface is seen to be indistinctly punctate. The specimens taken from the Spokane River are much larger than those collected in the Kootanie.

13. LYONSIA SAXICOLA, Baird.

L. *testa ovato-oblonga, medio gibba, tenui, fragili, antice producta, clausa, postice compressiuscula, hiante; umbonibus magnis, incurvis; epidermide olivacea, striata; margine dorsali rectiusculo, margine ventrali flexuoso, hiante.*

The length of a moderate-sized specimen is about 3 inches, of a large specimen 4½ inches; the breadth from the beaks to the ventral margin is about 2 inches and 2½ inches.

Hab. Holes in rocks in Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

This species is the largest of the genus that has yet been discovered. It is of an ovate-oblong shape, gibbous in the centre, produced anteriorly, compressed posteriorly and gaping. The beaks are large and incurved: it is covered with an olive-coloured epidermis, which is striated transversely. The ventral margin is gaping and flexuous. This species resembles considerably the *L. naviculа* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, and might be taken for a very large specimen of it, and, indeed, is considered to be so by Mr. Adams himself, who informed me he had taken identically the same species, as to size, &c., from the seas of Japan. Besides the size, habitat, and place of abode, this species differs from *L. navicula* in the form of the anterior extremity of the shell and the more gaping ventral margin. Owing to the peculiar place of abode (holes in the rocks), it varies considerably in size and form; but in all the specimens which I have seen, ten in number, it does not vary in the produced anterior extremity. The striæ seen on the surface of the epidermis do not appear to extend from it to the shell underneath. It lodges always, Mr. Lord says, in holes in the rocks, from which it is very difficult to extract it, without breaking it; for it would appear to take up its abode in a small hole, enlarging it as it increases in size itself. The substance of the shell, without being very thin, is exceedingly brittle; and few specimens were brought over without being cracked across in various places, apparently in the act of drying. The ossicle covering the front of the internal cartilage is strong and well developed.

14. CRASSATELLA ESQUIMALTI, Baird.

C. *testa parva, cordato-trigona, crassiuscula, olivacea, transversim undato-plicata, antice producto-rotundata, postice subtruncata, margine ventrali rotundata, umbonibus prominulis, lunula longe caudata.*

Long. rather more than ⅓ inch; lat. nearly ½ inch.

Hab. Esquimalt Harbour, Vancouver Island. (*Mus. Brit.*)

This species approaches very much in sculpture to the *C. corrugata* of Adams and Reeve ('Zoology of the Voyage of the Samarang'), from the Sooloo Sea, but differs very much in shape. The peculiar undulate plications are chiefly discernible near the umbones, the plicæ or ribs on the lower third of the shell being plain. The beaks are nearly central and prominent; the anterior extremity is somewhat produced, while posteriorly the shell is somewhat truncate. Only one specimen was found by Mr. Lord.

5. Description of two Species of Shells collected by Dr. Lyall, of H. M. Ship 'Plumper,' at Vancouver Island. By W. Baird, M.D., F.L.S.

Leda fossa, Baird.

L. *testa elongata, ovali, antice multo breviore, rotundata, postice elongata, in rostrum subacutum producta, transversim undulato-costata, in latere antico fossa transversa notata; umbonibus prominulis, margine ventrali rotundato; intus lævi; epidermide tenui, lutescente, nitida induta.*

Long. rather more than $\frac{1}{3}$ inch; lat. rather less than $\frac{1}{3}$ inch.

Hab. Esquimalt Harbour, Vancouver Island; dredged in from 10 to 15 fathoms water, by Dr. Lyall, of H. M. S. 'Plumper.' (*Mus. Brit.*)

This little shell is of an elongate form, much produced posteriorly; and near the anterior extremity it is marked by a longitudinal depression or pit, upon which the ribs are nearly obsolete.

Nucula lyalli, Baird.

N. *testa ovato-triangulari, tumida, crassa, umbonibus prominulis, antice breviore, subrostrata, postice declivi, elongata, margine ventrali rotundato, epidermide olivacea induta, longitudinaliter utrinque costata, costis fortibus, medio divaricatis; intus margaritacea; margine ventrali subcostato; dentibus anticis ad numerum undecim, posticis novemdecim.*

Long. rather more than $\frac{1}{2}$ inch; lat. rather more than $\frac{1}{2}$ inch.

Hab. Esquimalt Harbour, Vancouver Island; dredged by Dr. Lyall, H. M. S. 'Plumper,' in from 8 to 10 fathoms. (*Mus. Brit.*)

This very interesting species is the fourth of this peculiar divaricately ribbed group which has been discovered in a recent state. The three others are *Nucula divaricata* and *N. castrensis* of Hinds, and *N. mirabilis* of Adams and Reeve. This species approaches very nearly to the fossil species from the Crag, *N. cobboldiæ*, but differs from it in being less transversely ovate, in having the beaks more prominent, the posterior row of teeth in the hinge fewer in number (in *N. cobboldiæ* they are 22), and in the costations being stronger in proportion to the size of the shell, and much fewer in number. It was with some hesitation that I decided upon describing it as a new species; but these marks, the size, and the habitat all induce me to consider it as distinct.

I have named it after Dr. Lyall, of H. M. S. 'Plumper,' who has sent us only one specimen.

6. On the Genera and Species of Liotiinæ found in Japan. By Arthur Adams, F.L.S., etc.

M. Mörch imagines *Cyclostrema* to be allied to *Scala*; and the shell undoubtedly bears some resemblance to that genus. In *Liotia*, according to my observations, there are no intertentacular lobes, but

the foot is provided with the lateral filaments peculiar to the *Trochus* family; and Clark has also shown the genus *Adeorbis* to be a true Trochidian.

The little Japanese shell named *Cynisca japonica* by me, and *Liotia pilula* by Dunker, I now consider to be a true *Collonia*.

1. Genus Liotia, Gray.

1. Liotia clathrata, Reeve.

Delphinula clathrata, Reeve, Conch. Icon. sp. 21.
Hab. Seto-Uchi (Akasi, 15 fathoms).

2. Liotia armata, A. Ad., Annals, 1861.

Hab. Korea Strait, 46 fathoms; Mino-Sima, 63 fathoms.

3. Liotia syderea, Reeve.

Delphinula syderea, Reeve, Conch. Icon. sp. 23.
Hab. Seto-Uchi.

4. Liotia dædala, A. Ad.

L. *testa crassa, complanata, discoidea, alba, late umbilicata, pulcherrime radiatim striata; anfractibus 3½, planiusculis, bicarinatis, carinis validis subcrenulatis, anfractu ultimo antice dilatato tricarinato, interstitiis obsolete clathratis, carina superiore validiore, media postice evanida, inferiore crenata conspicua; umbilico magno, perspectivo; margine corrugato-denticulato; apertura circulari; peritremate continuo, extus varicoso.*
Hab. Gotto, 48 fathoms; O-Sima.

This is a very elegantly formed species, with the whorls exquisitely sculptured. In many of its characters it seems to approach the *Adeorbis verreauxii* of M. Fischer; but it is a true *Liotia*, having a circular continuous aperture, with the peritreme varicose externally. In form and general characters, however, it most resembles *Delphinula discoidea*, Reeve, but the keels are not nodose.

5. Liotia tantilla, A. Ad.

L. *testa parva, crassa, discoidea, profunde umbilicata, sordide alba; anfractibus 3½, convexiusculis, concentrice sulcatis, sulcis regularibus confertis, anfractu ultimo ad peripheriam rotundato, antice dilatato; umbilico mediocri, perspectivo; apertura circulari; peritremate continuo, extus varicoso.*
Hab. Gotto Islands, 71 fathoms.

A very neatly formed little species, most nearly resembling *L. australis*, Kien., which, however, is a much larger species, an example of which I have recently examined in the collection of Mr. Cuming. Kiener's figure, copied by Reeve and Philippi in their Monographs, is execrable.

2. Genus Cyclostrema, Marryatt.

1. Cyclostrema micans, A. Ad., Proc. Zool. Soc. 1850.

Cyclostrema pulchellum, Dkr. Moll. Japon. p. 20, t. 3. f. 5.
Hab. Seto-Uchi; Tsu-Sima; Mososeki; Akasi.

2. Cyclostrema cinguliferum, A. Ad., Proc. Zool. Soc. 1850.

Hab. Tsu-Sima, 26 fathoms; Mino-Sima, 63 fathoms.

3. Cyclostrema cingulatum, Dkr.

Cyclostrema cingulatum, Dkr. Moll. Japon. p. 20, t. 3. f. 11.
Hab. Tsu-Sima, 26 fathoms.

4. Cyclostrema sulcatum, A. Ad., Proc. Zool. Soc. 1850.

Hab. Mososeki; Tsu-Sima.

5. Cyclostrema anaglyptum, A. Ad.

C. *testa depresso-turbinata, alba, nitida, profunde et late umbilicata, spira elatiuscula; anfractibus rotundatis, carinulis concentricis acutis crenulatis, interstitiis lineis radiantibus late clathratis ornatis, basi carinulis confertis denticulatis instructa; umbilico magno, intus radiatim lirato; apertura orbiculari, margine crenato.*
Hab. Yobuko.

A very beautiful, richly embossed shell, with the style of sculpture very much resembling that of *C. reeviana*, but the form is more turbinate than in that pretty species.

6. Cyclostrema ammonoceras, A. Ad.

C. *testa depresso-turbinata, discoidea, late umbilicata, alba, solida, concentrice striata, radiatim costata, costis tenuibus subdistantibus ad suturas evanidis; anfractibus rotundatis; apertura circulari, peritremate continuo; labio callo parvo resupinato instructo.*
Hab. Tanabe; O-Sima.

The only species resembling this is *C. schrammi*, Fisch., from Guadeloupe, which has the same remarkable cornu-Ammonis appearance, but the whorls of which, instead of being rounded, have two concentric keels, which gives the species, says M. Fischer, the appearance of *Planorbis cristatus* with three rows of spines.

7. Cyclostrema biporcatum, A. Ad.

C. *testa parva, subdiscoidea, spira depressa, albida, late umbilicata; anfractibus 3, subplanulatis, ultimo antice dilatato, supra lævi, infra concentrice striato, ad peripheriam liris duabus validis transversis instructo; apertura circulari, peritremate continuo, simplici.*
Hab. Seto-Uchi; Akasi.

This little species differs from any of those described, and may easily be recognized by the double keel which surrounds the periphery.

3. Genus Morchia, A. Adams.

1. Morchia obvoluta, A. Ad., Ann. and Mag. Nat. Hist. 1860.

Hab. Tsu-Sima, 26 fathoms; Takano-Sima, in shell-sand.

Obs.—M. Meyer has named a fossil genus of Vermetidæ *Morchia*; and, in the last edition of Albers's 'Heliceen,' Von Martens has a subgenus *Morchia*. Both these names, however, have been imposed since I published the genus *Morchia* in the 'Annals' for 1860. It is a very curious little form, with an open umbilicus, and with the last whorl encroaching upon and nearly covering the others, as it does in *Neritula* and *Teinostoma*. In fact, it bears the same relation to *Tubiola* or *Turbo niveus* of Chemnitz that *Teinostoma* does to *Ethalia*.

Subgenus Tubiola, A. Ad.

Testa subevoluta aut laxe voluta; anfractibus concentrice striatis, rotundatis, simplicibus: apertura subcircularis, peritremate continuo; margine acuto, integro.

There are several shells, such as *Delphinula laxa*, Say (which with M. Fischer is a *Skenea*), *Turbo niveus*, Chemn. (which M. Philippi says might just as well be considered a *Skenea*), and *Skenea cornuella*, A. Ad., which cannot very naturally be received into any established genus. I have therefore thrown them together under the name *Tubiola*, on account of their resemblance to a little horn.

1. Tubiola nivea, Chemn.

Turbo niveus, Chemn. Conch. Cab. vol. x. t. 165. f. 1587–8.

T. *testa ovato-orbiculari, nivea, tenui, semipellucida, spira depressa; anfractibus rapide crescentibus, convexiusculis, concentrice creberrime liratis lineisque incrementi decussatis, suturis profundis, subcanaliculatis; anfractu ultimo magno, antice dilatato, ad peripheriam rotundato, ad peritrema contiguo; apertura perobliqua, subcirculari, postice angulata; peritremate continuo, simplici, acuto; umbilico peramplo, patulo, perspectivo.*

Hab. O-Sima, on the sands.

This shell agrees exactly with the original figure and description of Chemnitz's *Turbo niveus*. The *Delphinula lævis* of Kiener, or *D. nivea* of Reeve, is quite different, and may be considered a *Cyclostrema*. The present shell is doubtless very rare. It is not in Mr. Cuming's collection, nor have I seen it in any other.

2. Tubiola cornuella, A. Ad.

T. *testa subdiscoidea, ovato-oblonga, tenui, sordide alba, late umbilicata, apice elato; anfractibus 3½, rapide accrescentibus, rotundatis, ultimo ad peritrema soluto, striis incrementi ornato; apertura perobliqua, transversim ovata; peritremate continuo, acuto, integro, expanso.*

Hab. Mino-Sima, 63 fathoms.

In this species, which I described from a young individual as a

Skenea, in the 'Annals' for 1860, the whorls are disunited, but the volutions are not rolled on the same plane as in *Daronia spirula*.

4. Genus ADEORBIS, S. Wood.

1. ADEORBIS PLANA, A. Ad., Proc. Zool. Soc. 1850.
Hab. Gotto, 48 fathoms.

2. ADEORBIS CLAUSA, A. Ad., Annals, 1861.
Hab. Tabu-Sima, 25 fathoms.

3. ADEORBIS ORBELLA, A. Ad., Annals, 1861.
Hab. Mino-Sima.

4. ADEORBIS PROMINULA, A. Ad., Annals, 1861.
Hab. Mino-Sima.

5. ADEORBIS DEPRESSA, A. Ad., Annals, 1861.
Hab. Mino-Sima.

6. ADEORBIS PATRUELIS, A. Ad., Annals, 1861.
Hab. Mino-Sima.

7. ADEORBIS CORNICULUM, A. Ad., Annals, 1861.
Hab. Mino-Sima.

8. ADEORBIS SUTURALIS, A. Ad., Annals, 1861.
Hab. Tsu-Sima.

9. ADEORBIS JAPONICA, A. Ad., Annals, 1861.
Hab. Gotto; Mino-Sima.

10. ADEORBIS NANULA, A. Ad., Annals, 1861.
Hab. Mino-Sima.

11. ADEORBIS CARINATA, A. Ad.

A. *testa ovato-orbiculari, obliqua, depresso-conoidali, subdiaphana, alba, late umbilicata; anfractibus convexiusculis, transversim tenuiter striatis, rapide accrescentibus, ultimo antice dilatato, ad peripheriam acute carinato; apertura subtrigonali, antice angulata et producta, umbilico margine acuto.*
Hab. Seto-Uchi; Akasi.

The keel at the periphery is marked and prominent, forming an acute ledge round the last whorl. The only other species at all resembling it is *A. subcarinata*, found in the British seas.

12. ADEORBIS TROCHULA, A. Ad.

A. *testa orbiculari, depresso-conoidea, profunde umbilicata, supra convexa, infra plana, alba, semipellucida; anfractibus 5½, planiusculis, lente accrescentibus, suturis marginatis, anfractu*

ultimo antice vix dilatato, ad peripheriam obtuse angulato; apertura subangulata, antice vix producta, umbilico margine acuto.

Hab. Gotto, 48 fathoms.

This species resembles a small depressed *Trochus*, with a flat base, a somewhat angular periphery, and a deep rather narrow umbilicus.

13. ADEORBIS SUBANGULATA, A. Ad.

A. *testa ovato-orbiculari, subdepressa, vertice elatiusculo, alba, radiatim tenuiter striata, profunde umbilicata; anfractibus 3½, convexiusculis, ultimo antice dilatato, superne obtusim angulato, infra subplano; apertura subquadrata, antice producta; labro supra subangulato, umbilico margine acuto.*

Hab. Gotto, 48 fathoms.

The angular projection of the whorls is not at the periphery, but above it, which causes the subquadrate form of the aperture; whereas in the British *A. subcarinata* and the Japanese *A. carinata* the periphery is carinate, more or less, and the aperture triangular.

14. ADEORBIS DIAPHANA, A. Ad.

A. *testa depresso-orbiculari, alba, tenui, pellucida, late et profunde umbilicata, spira prominula; anfractibus 3½, subplanulatis, lineis incrementi ornatis; anfractu ultimo antice vix dilatato, ad peripheriam rotundato; apertura circulari; umbilico patulo, perspectivo, margine carinato.*

Hab. Gotto, 71 fathoms.

This little pellucid shell is more globose than the species of *Adeorbis* generally, and the aperture is nearly circular, with a continuous peritreme. By some it would be called a *Vitrinella*; but the limits of that group do not seem to be yet determined.

February 24, 1863.

E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

Dr. Sclater exhibited a skin of the female of the splendid Pheasant, figured by Mr. Gould in the 'Birds of Asia' under the name *Diardigallus prælatus*, which had been transmitted to him from Siam by Sir Robert Schomburgk. Dr. Sclater remarked that, it being now certain that the figure upon which *Phasianus crawfurdi*, Gray, had been founded, had been intended for some other bird, the oldest specific name for this species appeared to be *prælatus* of Prince Charles Bonaparte (Compt. Rend. xliii. p. 415, 1856); but that another synonym, not quoted by Mr. Gould, was *Gallus diardii*, under which name Dr. Schlegel had described and figured this bird

in 1857, in his 'Handleidung tot de Beoefening der Dierkunde' (vol. i. p. 379).

Dr. J. E. Gray exhibited a specimen of the young of the domestic Fowl in spirits, with a singular malformation of the beak and foot, and read the following letter addressed to him by Mr. W. Horn concerning it:—

"21 Belitho Villas, Barnsbury,
February 13th, 1863.

"Dear Sir,—With this I send you the body of the chicken I spoke to you about, the beak and feet of which bear a close resemblance to those of a Parrot, and I beg your acceptance of it.



"It may perhaps be as well if I state the circumstances which, it has occurred to me, may account for this freak of nature. I had one of the Parrot tribe, which, on account of the noise it made, was frequently placed in the yard where I kept a breed of white bantam fowls. If any of these came near the Parrot's cage to pick up the food it scattered, it became much enraged and screamed violently. Soon after this I sat two hens on eggs, and in each brood I had one chicken of this strange form. My impression at the time was, and now is, that one of the hens had been frightened by the Parrot, and an effect thereby produced on some of her eggs.

"When I first mentioned it to you, I thought it had but three toes; on closer inspection I perceive there is a fourth toe; but the form of the foot still very closely resembles that of a Parrot.

"I am,
"Dear Sir,
"Yours very truly,
"Wm. Horn."

"P.S. The Parrot was never let out of the cage, and was, I believe, a female."

"*J. E. Gray, Esq.,*
British Museum."

Mr. F. Buckland gave some account of the progress of his experiments in hatching and rearing Salmon and Trout by artificial means in the tanks of the Zoological Society and elsewhere, and made some remarks on the monstrosities observed by him amongst the embryos of these fishes.

The following letter, relating to the habits of the Caddis-worm (larva of *Phryganea*), addressed to Dr. Gray by Miss M. E. Smee, was read to the Meeting:—

"Feb. 19, 1863.

"My dear Sir,—I have ventured to send for your inspection a box containing cases made by the Caddis-worm, the worms of which were collected by myself from that part of the Wandle which runs through our garden at Wallington.

"I found, on examining the natural cases, that they were made of different materials. For instance, some were constructed of small stones finely glued together, others of sticks, and some were formed of sticks and stones combined. Again, some were made of leaves of water-plants, and I observed that others were formed of the shells of creatures which inhabited the same stream.

"As I had never seen or heard of these Caddises before, I felt much astonished that creatures somewhat resembling maggots, and living at the bottom of the river, should live in houses built by themselves, and yet that these houses should differ so greatly in their construction. Indeed I was so interested that I determined, if possible, to discover the capabilities which these creatures possessed of forming different kinds of dwellings under different circumstances. I very much desired to know whether they could construct cases from other kinds of materials, besides those usually existing in the river in which they lived.

"To ascertain the fact, I accordingly turned the worms out of their natural cases, and gave them different substances to work upon; but I found that they had not an equal facility with every material; for whilst with some they formed cases which were attended with good results, with others they entirely failed.

"The worms succeeded well when they were supplied with pieces of glass, amethyst, cairngorm, cornelian, onyx, agate, coral, coralline, marble, shells, jet, brass shavings, gold-leaf, silver-leaf, when existing as small fragments.

"When, however, the worms were supplied with round objects, they invariably failed; and although I have repeatedly tried them with small glass beads and other round objects, I never found that with these they were capable of forming a case.

"But these Caddises also failed to make themselves houses from other causes than that of the roundness of an object; for I found that if these creatures were placed among materials strongly scented, or which contained poisonous matter, not only were they unable to build with them, but in most cases the substances proved fatal to the worms. When I tried them with pine-wood, my Caddises would in a short time become completely stupified from the turpentine contained in the wood, from which they often never recovered. With pieces of coal, brick, or slate they never succeeded in making a case, although these substances did not cause their death. The reason for their failure I attributed to some kind of odour which might have emanated from these different materials. With painted or varnished objects they also failed. Not every kind of metal was suit-

able for their buildings; for neither with tin, or lead, or copper did they succeed. I found that if one Caddis was not able to make a case out of any one kind of material, no other Caddis could succeed, although I might try several others with the same material.

"After a Caddis had made two or three houses, I used to give it something fresh to work upon, and oftentimes I supplied it with a totally different material. With these new substances it proceeded to build as quickly as before, constructing its new habitation according to the shapes of the pieces it had then to deal with.

"The maximum amount of artificial cases I could get any Caddis-worm to make was five, the last one being very brittle, the parts being scarcely glued together. After they had built so many houses, if turned out of the last house, they would simply bury themselves and remain in a quiescent state. But I think that if the Caddises were procured early in the year, the number of their cases might be considerably increased.

"It is a most curious sight to see these little creatures building their houses, beginning by cementing a number of pieces loosely together. This is merely used as a foundation for building its subsequent structure; for it is always cast off before the house is completed. After they have laid the foundation, they proceed by lifting up each piece of stone, or whatever the material may consist of, with their feet, turning it on all sides to discover whether it will fit into the space, and if it does not, as is frequently the case, that piece of stone is instantly rejected, and another is tried after the same manner, until they succeed in finding a suitable piece, when it is cemented to the other stones by a secretion which I ascertained proceeded from their mouth.

"When their house is made, the body of the creature is completely encased; their heads and feet alone protruded.

"In their natural state, the weight of these cases varies much. They are twice as heavy, and made of more solid materials, when the creatures inhabit rapid streams than when they live in still waters. The reason of this difference is, I suppose, to enable themselves to keep, by the weight of their cases, at the bottom of the water.

"I noticed that, after the Caddis-worms were turned out of their cases, air-bubbles appeared on the surface of their bodies. If placed under these circumstances in running water, these air-bubbles would cause the creatures to rise to the surface and there float until they died from exhaustion, caused by their hard endeavours to reach the bottom. According to the roughness of the water, so must be the weight of their cases.

"When in the pupa-state, their heads and feet are entirely withdrawn into their cases; and they remain in a dormant state, neither eating nor moving, until they turn into flies, their cases being more or less split in the act of transformation.

"I used to feed some of my Caddises whilst in the larva state with small pieces of raw meat, which they ravenously devoured; they would even eat a common house-fly, leaving only the wings, head, and leg; but however hungry they might be, yet they never could be induced to touch cooked meat.

"I found it was quite necessary for the Caddises to have plenty of food whilst in the larva state, to enable them to have strength to undergo the transformation.

"Trout are the great enemies of the Caddises, as they eat them up, cases and all, in every stage of their existence; but they consider the worms without the cases as especially dainty morsels.

"On the 24th of January this year, I observed that the Caddises were just hatched; and although some were so small that they were only visible with a lens, yet every one was busily employed in making its little house.

"They have grown so quickly that, since that date, they are now quite conspicuous at the bottom of the river.

"The box I send to you contains in the centre the cases made from the various materials I gave to the worms, and encircling the artificial cases are the natural habitations as taken from the river.

"Trusting you will find them worthy of your inspection,

"Believe me to remain,

"My dear Sir,

"Yours faithfully,

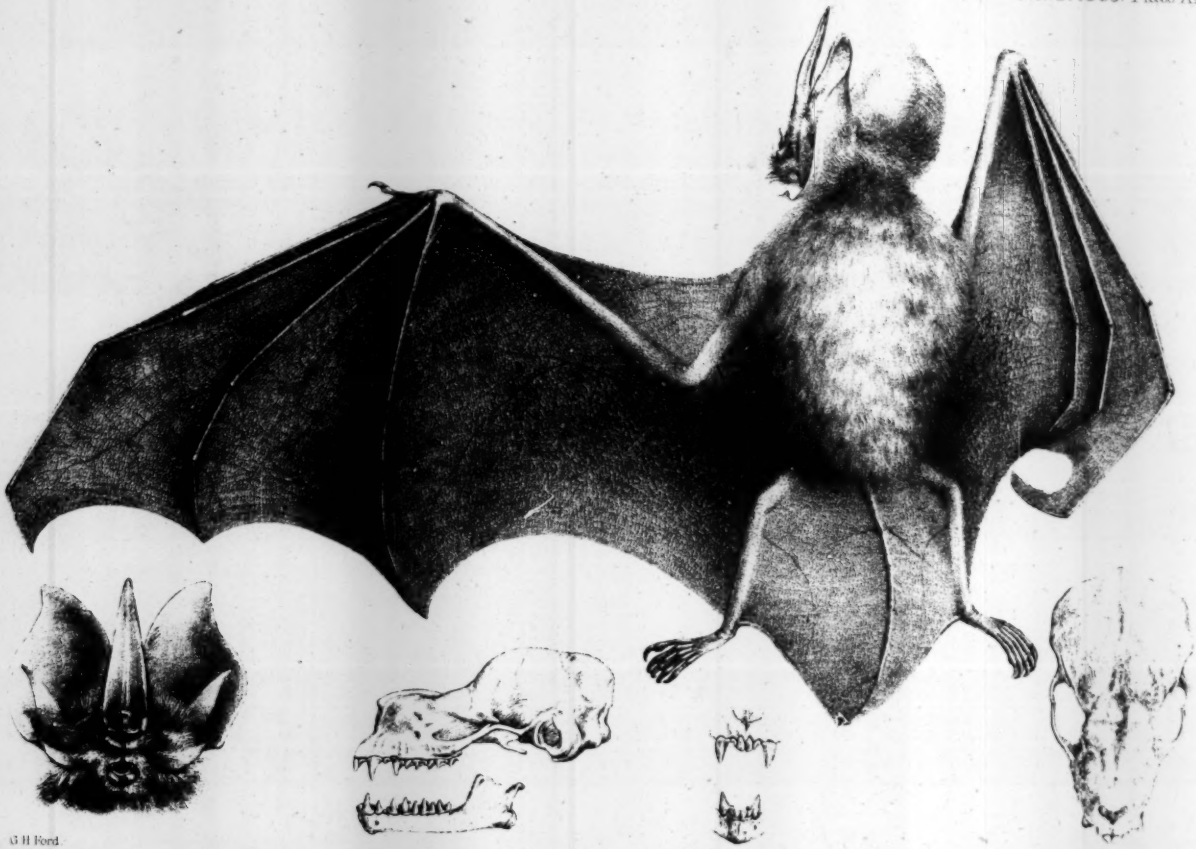
"Elizabeth Mary Smee."

"*To Dr. Gray, F.R.S.,*
of the British Museum."

"P.S. The Caddises are so excessively pugnacious that I am always obliged to keep each in a separate vessel. If that precaution were not taken, instead of peaceably constructing their houses, a fierce warfare would be carried on between them, which would result in the death of the weakest party. After one was killed, the survivor would set about building its house. I generally kept about thirty small white earthen jars at a time, each being filled with water, and containing a single Caddis-worm, with the particular material of which I wished its house to be constructed.

"The Caddises are provided with two little hooks, situated one on each side of the *tergum*. These little hooks are curved and sharply pointed. With these they securely fasten themselves in their houses, by which extra strength is given to resist their being torn from their cases. At first, on account of these hooks, I experienced some difficulty in turning them out of their habitations. Indeed, I was often so unfortunate as to break and consequently spoil their cases; or sometimes, after catching the creature by its head and trying to pull it forcibly out, I have known the creature to retain its hold so firmly by means of its hooks, that its body has been pulled in two rather than it would let go its hooks and suffer its house to be taken from it. At last I found that when a pin was gently pushed into the end of the case, the slight irritation would cause the Caddis to crawl entirely out of its house, and thus I was enabled to preserve the case without causing injury to the worm."

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G.H.Ford

LONCHORHINA AURITA

W.West, imp.

The following papers were read:—

1. On a New Genus and Species of Leaf-nosed Bats in the Museum at Fort Pitt. By Robert F. Tomes.

(Plate XII.)

In a collection of Bats preserved in spirit, and forming part of the Museum at Fort Pitt, Chatham, which has been submitted to my examination by Dr. Sclater, is one which constitutes a new and well-marked genus of the *Phyllostomidæ*, or Leaf-nosed Bats of the New World. It is more nearly allied to the genus *Macrotis* than to any other; but differs from it, among other respects, in having its lance-shaped nose-leaf developed to an enormous extent. I characterize and name it as follows:—

Lonchorhina, gen. nov.

Top of the head somewhat elevated; face depressed; facial crests complicated, consisting of a very long and pointed posterior leaf, in front of which are two pits, more or less surrounded by prominent fleshy excrescences; lower lip with a smooth triangular space in front; ears long and broad; longest finger with four phalanges; wing-membrane extending to the distal extremity of the tibia, and attached to the os calcis *; tail extending to the whole length of the interfemoral membrane, as in the genera* Macrotis *and* Vespertilio.

The posterior lanceolate facial leaf is in this Bat of great length, being fully as long as the head of the animal; it is pointed, and has a very distinct midrib. In front of this leaf is a deep pit, which is divided into two by a ridge which is continuous with the central rib of the leaf; in the bottom of the pits thus formed are the nostrils, which are small and ovoid. The septum between them is produced anteriorly, and developed into a prominent and trifoliate fleshy excrescence, which almost conceals the pits behind; it has a central or upright lobe, exhibiting outwardly a rounded footstalk, surmounted by a flattened top, the edge of the flattened summit being directed upwards, and having five very slightly prominent, but very distinct, denticulations. Besides this central lobe are two lateral ones, which present a thin edge externally, and are continuous with each other across the bottom of the central one. Where this horizontal ridge runs across the central one, it is produced into a distinct point or tubercle. On each side of the pits, behind the trifoliate leaf, is a prominent, acutely conical, vertical projection about a line in length. Below the trifoliate leaf is a transverse hollow, divided vertically by a faintly marked septum, and below this is another transverse leaf, forming the lower boundary of the hollow; this leaf is but slightly prominent, and has its ends curved upwards and terminating in two warty excrescences contiguous to the two acute projections near the nostrils. Below this is a flat space, constituting the upper lip.

The lower lip has a large central space of a triangular form, which is naked, and bounded laterally by a broad, smooth, and somewhat elevated margin; at its inferior point is a single small wart, and in

the middle, forming the front of the lip, is an enclosed granulated space.

The ears are as long as the head, broad and pointed, with the lobular parts much developed, and extending forward almost to the corner of the mouth. Tragus more than half the length of the ear, tapering evenly to a subacute point; near the base, externally, is a prominent though somewhat obtuse angle, and above this a notch, forming another angle, more acute, but less prominent, than the other; above the notch there is no angle, but a rounded and slightly prominent part, and from this to the tip the tragus tapers pretty evenly. The auditory opening is partly surrounded (posteriorly) by a prominent fleshy ridge of a lobular form, which will fold forward and completely close the opening.

The longest finger is composed, as in all the Phyllostomidæ, of four phalanges; the thumb has the two phalanges of nearly equal length. The wing-membrane extends barely to the distal extremity of the tibia, which it crosses over, in front, and is attached to the base of the *os calcis*, somewhat as in the genus *Natalus*.

The tail is long, but composed of only nine joints, and extends the whole length of the interfemoral membrane, as in the genus *Vespertilio*. The feet are large, with the toes of equal length, and the claws long and hooked.

The skull in its general outline bears considerable resemblance to that of *Macrotis*; but the cerebral region is more elevated, and the facial part more depressed. It is so much depressed just at the posterior boundary of the nasal bones as to occasion a deep hollow or longitudinal pit. The nasal bones are very differently formed to those of *Macrotis*, being very much arched from the fore to the hinder part. The maxillary bones are considerably inflated between the nasal opening and the orbits. All the facial part of the skull is much less compressed than in *Macrotis*.

Dentition:—Inc. $\frac{4}{4}$; Can. $\frac{1-1}{1-1}$; Premol. $\frac{2-2}{2-2}$; Mol. $\frac{3-3}{3-3}=\frac{16}{16}=32$.

The middle *upper* incisors are large, flat, and somewhat pointed; the lateral ones minute and pointed, and with a posterior lobe near the base; the canines are rather small and acute; the first premolar is very small, roundish, and with two cusps, the anterior one being the most prominent; the second premolar is very prominent, and has the same carnassial form which is so common in the *Chiroptera*.

The lower incisors are symmetrically arranged, rather small, and flat, with their edges somewhat lobated; the canines are slender, straight, and with a distinct cingulum; the first premolar is smaller than the second, conical, acute, and with a slightly projecting posterior lobe near the root; the second premolar is rather long, angular, and acute, with a well-marked cingulum.

The tongue is thick and short, with six well-marked, transverse, curved ridges, which are most distinct on the front part, and behind these are indications of others. All the upper surface of the tongue is clothed with fine points, which are directed backward, like those on the tongue of the Felidæ.

LONCHORHINA AURITA, n. s.

Nearly the whole of the face is hairy, the hair having the same quality and colour as that of the back; the nose-leaf and fleshy excrescences are naked, but a few hairs spring from the edges of the former near the base; ears hairy behind for three-fourths of their length; inside they have a distinct band of hairs on the inner margin, which does not extend further than three-fourths of their length from the base; and there is another, but smaller, band of hairs inside the lobular parts.

The fur of the upper parts is nearly confined to the body, but there is a little scattered on the humerus and the contiguous end of the forearm. Beneath, there is a little whitish hair powdered on the membrane near the flanks and forearms.

All the upper parts are light reddish brown, the fur nearly unicolor; beneath similar, but duller in colour and paler on the pubes. Cutaneous system dark reddish brown.

	″	‴
Length of the head and body	2	3
——— of the tail	1	9
——— of the head	0	9¾
——— of the ears	0	8¾
——— of the tragus	0	7
Breadth of the ears	0	8
——— of the tragus, at its widest part	0	3
Length of the forearm	1	11½
——— of the longest finger	3	10
——— of the fourth finger	2	6½
——— of the thumb	0	4
——— of the tibia	0	9½
——— of the foot and claws	0	7
——— of the *os calcis*, about	0	6
Expanse of wings	13	4
Length of the nose-leaf, taken behind	0	9½
Total length of the skull, from front of nasal bones	0	8¾
Breadth across the orbits	0	5
Length from the point of the middle upper incisor to the posterior edge of the last molar	0	4
Length of the lower jaw	0	6

Hab. The bottle from which this specimen was taken contained several West Indian species, in which the *Mormops blainvillii* and the *Chilonycteris gymnonota* of Wagner were conspicuous. The latter is distinguished from other species of the genus by having the wing-membranes springing from the middle of the back, instead of the sides of the body; and there can be but little doubt that it is the *Pteronotus davyi* of Dr. Gray. Of course Dr. Gray's specific name will take precedence of that given much later by M. Wagner, and the name of *Pteronotus* may be conveniently used to distinguish the species as a subgenus of *Chilonycteris*. It is probable that the specimen from which I have taken the foregoing description may have been received from the same locality as the *Mormops* and *Pteronotus*.

Obs.—Since the above was written, I have made a careful comparison of the skull of this singular Bat with that of several other species hitherto doubtfully placed with the Phyllostomidæ. The following are the results:—The genus *Schizostoma*, which is rather intimately allied to *Vampyrus*, bears also considerable resemblance to the genus *Macrotis* in the general conformation of the cranium and the lower jaw, and also in the very great similarity in the dentition. The form and size of the ears, too, in these genera are very similar. *Macrotis*, again, bears in several particulars an intimate relationship with the present genus *Lonchorhina*. More especially may be mentioned the length of the tail, which extends in both genera to the whole length of the interfemoral membrane, as in the genus *Vespertilio*, the considerable development of the ears, the size and freedom of the feet, and, perhaps more than all, the general contour of the cranium.

Pursuing the comparison, we find that *Lonchorhina* bears very considerable resemblance to *Chilonycteris*, in the form of the anterior part of the cranium, in the number and relative size of the teeth of both jaws, and in the form of the lower jaw. Passing on from *Chilonycteris* to *Mormops*, the skull of the latter is seen to be an exaggeration of the former, having the facial part still more depressed, and the cerebral part still more elevated. The upper teeth in both these genera are very similar; and those of the lower jaw do not present any essential differences, the chief one being that in *Chilonycteris* the middle premolar is very much smaller than the corresponding one in *Mormops*, which, although smaller than those on either side of it, is not minute. All the above-mentioned genera agree with each other in the presence of a fourth joint to the longest digit of the wing, and in fact must be said to bear considerable resemblance in most particulars, saving in the degree of development of the tail and the existence or absence of a hastate nose-leaf. However, it may be said that those species which have not a nose-leaf resembling that of the ordinary Phyllostomidæ have nevertheless some cutaneous development about the face, nose, or mouth, and cannot be properly called simple-nosed species.

There is another very singular genus, of which I have before spoken in communications to the Society, and which I have regarded as allied to *Molossus*, but I have mentioned that it possesses four phalanges in the longest finger. I allude to the genus *Mystacina*, which has hitherto been found only in New Zealand. When preparing my paper on the Bats of that country, I had not examined either *Mormops* or *Chilonycteris*; but, on afterwards working out some West Indian Bats, was at once struck with certain resemblances between the latter and *Mystacina*. Without at present alluding to the details of structure which have induced me to arrive at this conclusion, I take this opportunity of stating that I now regard *Mystacina* as an aberrant form of Phyllostomidæ, coming after the several genera which have been compared with each as above, but differing more from them than they do from each other.

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J. Wolf, del. et lith.

M & N Hanhart, imp.

HYPHERPES CORALLIROSTRIS.

2. On a New Bird from the Island of Madagascar. By Alfred Newton, M.A., F.L.S., F.Z.S.

(Plate XIII.)

My brother, Mr. Edward Newton, Assistant Colonial Secretary at Mauritius, and a Corresponding Member of this Society, having had last autumn the good fortune to make a second visit to Madagascar, has sent me a collection of birds from that island, containing many objects of great interest, among which is one that I believe forms a genus very distinct from any previously known. This I have now the honour to exhibit and describe.

Hypherpes*, genus novum *Certhianum* vel *Sittinum*.

Char. Gen.—*Rostrum breve, robustum, leviter emarginatum, ad apicem aliquanto compressum, rictu setoso. Alæ mediocres, rotundatæ, ad caudam mediam attingentes, remige quarto, quinto et sexto æqualibus; tertio septimum, et octavo secundum, superantibus; primo multo breviore. Cauda mediocris, prope æqualis, rectricibus duodecim aliquanto rigentibus. Pedes validissimi, tarsis quam digiti medii posticique longioribus, unguibus compressis, subvalidis.*

Hypherpes corallirostris, sp. nov. (Pl. XIII.)

Capite, gutture, pectore et abdomine schistaceo-brunneis, olivaceo indutis; collo, dorso, alis caudaque supra fusco-cæruleis, virente tinctis: remigibus fuscis, extus pallide marginatis, intus cervino latius limbatis, ut in Tichodroma: *uropygio et crisso subrufescentibus, rectricibus obsolete fasciatis: rostro toto coccineo; pedibus plumbeis: iridibus obscure rubris.*

Longitudo tota 4·8 poll. Angl. et dec.; rostri a fronte ·4, a rictu ·65; alæ 2·9; caudæ 2·2; tarsi 0·9; digiti medii cum ungue 0·8, postici 0·87.

March 24, 1863.

W. H. Flower, Esq., F.Z.S., in the Chair.

Mr. F. Buckland made some remarks on the progress of the experiments for hatching the ova of Trout and Salmon in the Society's Gardens.

Mr. Wallace made some remarks on a Hornbill living in the Society's Gardens, which he believed to be a discoloured specimen of *Buceros* (*Hydrocissa*) *pica*, a common Malaccan species.

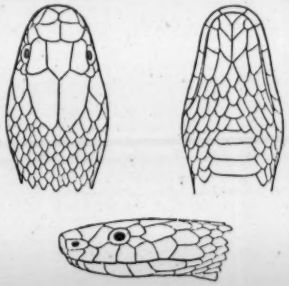
* ὑπὸ, *sub*; ἕρπης ex ἕρπω, *repo*.

The following papers were read:—

1. Description of a New Species of Hoplocephalus with Keeled Scales. By Gerard Krefft, Corr. Memb.

Hoplocephalus carinatus, sp. nov.

Scales in 23 rows. Anal entire. Ventrals 165. Subcaudals 54. Body elongate and rounded; tail rather short, not distinct from the trunk, tapering, ending in a conical spine. Head broad, quadrangular, distinct from the neck; muzzle short and broad; eye moderate, pupil rounded; rostral broad, just reaching the surface of crown, with a groove along the lower edge; anterior frontals moderate; posterior frontals much larger, five-sided, rounded behind. Vertical moderate, five-sided, with an acute angle behind; superciliaries large, raised above the eye; occipitals moderate; one anterior ocular, slightly grooved; two posterior ones; one large temporal shield, two smaller ones behind; no loreal, this being replaced by the nasal; the second upper labial, anterior ocular, and posterior frontal bend down on the sides. Seven upper labials, the third and fourth touching the orbit.



Scales rather narrow and elongate, in twenty-three rows anteriorly, somewhat broader, and in nineteen rows posteriorly, strongly keeled, forming fourteen raised lines upon the back and sides; brownish olive above, with some irregular interrupted blackish rings, which become more and more obsolete towards the tail; skin between and upon the underside of the scales black; belly whitish, clouded with purplish grey on the sides, much darker towards the tail, which is of a uniform purplish colour below.

This *Hoplocephalus* differs from all the other known species in the strongly keeled scales and the seven upper labial shields. Total length 38″.

Discovered by Mr. James J. Wilcox near Grafton, in the Clarence River district.

2. On New and little-known Birds from China. By Robert Swinhoe, F.Z.S., etc.

Fam. Picidæ.

In the valley of Foochow I observed among the pine-trees a brown species of Woodpecker feeding off some insects attached to the resinous gum that exuded between the scales of the bark. It continued active in its pursuit, running round and up the trunk, occasionally halting a few seconds and uttering a hoarse shaking note, not unresembling a laugh. I shot the bird, and found its head, base of bill, and many parts of its body smeared with the gum among which it was feeding. A female, which I afterwards procured from the same locality, had the head quite disfigured by the dried mass of resin, which glued the feathers of its crown together. This fact, I learn from Jerdon's book on 'Indian Birds,' has been observed before by Mr. Blyth and others, in the species of Indian *Brachypternus*. The Foochow brown Woodpecker is also a *Brachypternus*, at once distinguishable from its Indian congeners, *Micropternus phaioceps*, Blyth, and *M. gularis*, Jerdon, and the small Malay species, *M. badius*, Horsf., by its much browner plumage, the under parts especially being of a deep dusky brown instead of chestnut, and by its long narrowed feathers with dark central lines on the crown and occiput. The Chinese bird, moreover, appears to be larger, the female being somewhat larger than the male. I propose to call this

Brachypternus fokiensis, sp. nov.

General colour brown, banded narrowly on the back with chestnut; quills and tail chestnut, banded broadly on the former and narrowly on the latter with brownish black; feathers of the head and neck narrowed and lengthened, in the male dusky yellowish grey, in the female light chestnut, with deep-brown central stripes, paler in the female. The masculine distinguishing mark is the patch of crimson specks (blood-tips to the feathers) that occur on the cheek just under the eye. Bill bluish grey, with more or less greenish yellow on the lower mandible; irides reddish brown; legs and claws greenish slaty.

♂. Length 8·5 inches; wing 5; tail 3·7; bill, at front, 1; tarse ·8.

♀. Length 9·5; wing 5·3; tail 3·7.

I have never received this bird from any part of China but Foochow, where it is not particularly common. I have drawn my name from the province of which Foochow is the capital. On *Micropternus phaioceps*, Blyth, M. Malherbe has founded two species—*Phaiopicus blythii* and *P. rufonotus*; but both Jerdon and Blyth consider these to be identical. The *Micropternus gularis*, Jerdon, is the *Phaiopicus jerdoni* of Malherbe.

While on the subject of the Woodpeckers, I should like to make a few remarks on the eastern races or so-called species of the *Picus major* group, namely, *Pici mandarinus, luciani, gouldii*, and *cabanisi*

of Malherbe's 'Monograph.' The form of this bird, found in the north-west Himalayas, and described by Jardine and Selby as *P. himalayanus*, and Hodgson's species, *P. majoroides*, from the south-west Himalayas, both appear to have the red breast-spot which, in the adult dress, adorns the breast of the Chinese bird. I will here add some remarks on our Chinese bird, made after a careful comparison of my series from China with the plates and descriptions in M. Malherbe's work.

PICUS MANDARINUS, Malherbe.—*P. major*, L., apud Von Schrenck and Middendorff.

M. Malherbe has described and figured four species of true *Picus* from China: of the exact locality of one of these only he speaks with confidence—his type of *P. mandarinus* from Whampoa in the Museum at Berlin. I have in my collection a specimen from Whampoa, three from Canton, three from Foochow, and one from Pekin. From Whampoa and Canton I have two skins which answer to the brown under-plumage of his *P. luciani*, but have broader and more black bands on the lateral rectrices. I have two from Canton answering to *P. mandarinus*, but with a less bright red spot on the breast. My three birds from Foochow correspond nearly to his *P. gouldi*, which I presume is from Shanghai, but are browner on the under parts, and also have indications of the red spot on the breast. My example from Pekin is of the bright under tints of *P. cabanisi*, with an equally bright red breast-spot; but has more white on the wings, and the almost white lateral rectrices of *P. luciani*. From a careful comparison of the skins of this variable Woodpecker in my possession, I have come to the conclusion that they are all certainly of one species; for if we were to go on such nice specific distinctions as those pointed out by M. Malherbe, every bird even out of a number from the same locality might be regarded as a distinct species. In one of my Canton birds the secret of the very brown under plumage is developed; it is a young male with the crown red. Hence I gather that the special brown plumage in this species is a mark of the young, the red pectoral spot showing itself and intensifying as the bird advances to maturity, while the under plumage at the same time whitens. The white on the wings and tail is always less in the young individual, and widens considerably with advancing age. No two specimens agree precisely in the size or distribution of the white on the wings or the bands on the tail. The further north the locality whence the birds are derived, the larger their sizes generally, and more conspicuous the white markings. My Foochow specimens are larger than those from Canton and Whampoa, and have more white on the wings and tail; while the bird from Pekin is as light on the under parts as *P. major*, though, being adult, it carries the characteristic bright red pectoral spot. At the same time, being from a northern locality, the white spots on its wings and the white bands on its tail are very largely developed. Had M. Malherbe known the exact localities of the individuals he describes from, and had he had a larger series of skins to examine,

I do not think he would have advanced such strong opinions as to the specific merits of the four species he has introduced into his excellent work.

Genus Alauda.

Alauda pekinensis, sp. nov. Pekin Skylark.

Smaller than *A. arvensis*, L., with longer wings; paler, without the olive wash; head much less crested.

Length 7·5; wing 4·7; tail 3·1; tarsi ·9.

My two specimens from Pekin I have compared with six specimens of the English bird shot about the same season. Both my examples are males, one mature, the other a bird of the year. My younger specimen is, as usual in Larks, most distinctly marked, the eyebrow, lore, throat, and nape being nearly white, the latter spotted. The mature bird is more rufescent on these parts, but is otherwise generally paler. The six English Larks vary a good deal as to particular marks and length of wing. They are all longer than my two birds, and yet the longest-winged of the lot does not quite attain the alar length of our birds. They all unite in having their dark parts of a much richer brown, and their whole plumage washed with olive-yellow, which is by no means apparent in the Pekin birds; while the latter have much less crest.

Alauda cœlivox, Swinhoe. South-China Lark.

Of much richer plumage than the North-China Lark, much smaller, with more developed crest.

Hab. Formosa, and from Canton to Foochow.

Length 6·5; wing 3·6; tail 2·4; tarsi ·9.

Alauda intermedia, sp. nov. Shanghai Lark.

Capt. Blakiston has brought from Shanghai two Larks, which occupy a position so entirely between *A. pekinensis* and *A. cœlivox*, that it is impossible to refer them to either. They constitute an intermediate race, which might by analogy be expected to occur on the boundaries that divide the northern race from that of the south; and certainly, geographically speaking, the Yangtsze River may be considered the dividing-line of the northern area of China from the southern. This bird may perhaps be regarded as a hybrid form between the two species, which in this locality may be supposed to meet. I could not discover any striking differences in the song of the Shanghai bird from that of *A. cœlivox*, nor yet from that of the Pekin Lark. But in size and general appearance the three appear certainly distinct.

The Shanghai species may be characterized as intermediate to *A. pekinensis* and *A. cœlivox*, with proportionately longer wings than either, and less crest than the latter. Its first primary quill is more nearly of a length with the second than in the Pekin Lark.

Length 6·8; wing 4·2; tail 2·8; tarsi ·9.

Genus ANTHUS.

Neither Von Schrenck nor Middendorff notice a Rock-Pipit from Siberia or the Amoor; nor has one yet been noted from Japan. I have never traced the form in any part of China. We are, however, indebted to Capt. Blakiston for the capture of a specimen of this group, allied to *A. obscurus*, L., on the banks of the Yangtsze River, 150 miles inland. This skin closely tallies with one in Mr. Gould's collection from Ireland; but ours has a whiter face and cheek, and the pectoral spots, which blend away obscurely in the Irish skin, are in ours distinct and well marked. On the specific merits of the various forms of Rock-Pipit procured in different parts of Great Britain and Europe I will leave European naturalists to dispute. For the present, until the acquisition of a larger number of specimens shall prove the Chinese bird identical with the varying forms of the West, I propose to consider ours as distinct, under a specific designation taken from the name of its discoverer. It may, however, be only a well-marked race, to which the British forms may be found occasionally to assimilate; or it is just possible that the specimen procured in Ireland may be one of the several Eastern birds that in some unaccountable way has found its way to the shores of Great Britain.

ANTHUS BLAKISTONI, sp. nov.

Bill blackish brown on culmen and tip, light brown on remainder; legs blackish brown, paler on tarsi; upper parts light yellowish brown, grey on the nape; crown and back with centres of feathers deep brown; lore, eyebrow, and chin cream-white; under parts cream-white, spotted on the breast and streaked on the flanks with brown; axillaries pure white; wings brown, feathers edged paler; coverts and tertiaries broadly edged and tipped with cream-white, forming a double bar across the wing; tail brown, the central feathers yellowish brown, edged paler; the outer lateral tail-feather, on the entire outer web, and great part of inner near the apex, white; second lateral edged exteriorly and largely tipped with white.

Length 5; wing 3·7; tail 2·7; tarsi ·85.

ANTHUS GUSTAVI, n. sp.

This species, which visits the island of Amoy for a few days, about the middle of May, may I think be regarded as a summer visitant to the south of China. Mr. Blyth has examined a specimen, and assures me that it differs from all the Indian species he is acquainted with; and I can find nothing in Europe approaching it. It is more nearly allied to some Australian forms. It is about the size of *A. pratensis*, L. I have named it after Gustavus Schlegel (son of Dr. Schlegel of Leyden), who was the first to procure the bird at Amoy.

Length 6; wing 3·1 to 3·4; tail 2·3; tarsi ·88; bill, along front, ·5.

Bill and feet strong, approaching *Corydalla*, the former with a slight upward curve; throat, axillaries, and centre of belly pure white; upper parts yellowish brown, with a rich chestnut-tinge, the

centres of the feathers carrying very broad stripes of brownish black. In the majority of skins, the feathers of the back are broadly edged with yellowish white; breast and flanks with chestnut-ochre, spotted on the former and streaked on the latter with brownish black; the spots run in single line up either side of the lower neck close to the bill; eye-streak, lore, cheeks, and under neck ochreous; central tail-feathers blackish brown, edged with olive-chestnut; the outer lateral being nearly white, with a darker outer web; the second lateral has only a broad longitudinal pale streak along the inner web; wings blackish brown, edged with olive-brown, the coverts and some of the tertiaries being broadly edged and tipped with cream-white, forming a double bar across the wing; under wing for the most part whitish, with a slight rust-tinge. Bill, upper mandible, and tip of lower deep brown; edge of upper and basal two-thirds of lower pale flesh-colour; inside of mouth pale yellowish; eye-rim blackish brown; iris deep hazel; ear oval, aperture occupying the half furthest from bill; legs and claws brownish flesh-colour. Some specimens are more strongly washed with rusty ochreous, especially on the under wing and under tail-coverts. Some have more olive on the upper parts than others. They vary also in size and intensity of the blackish markings, as also in the pale yellow edgings to the dorsal feathers; but none depart from the well-marked general characters. This Chinese bird may perhaps be considered one of the most striking and handsome species of the difficult and already well-stocked genus *Anthus*.

Salicariæ.

Calamoherpe fumigata, n. sp.

This migratory species, which passes Amoy in May to the interior of China, I obtained in sufficient abundance in 1861. I place it in this genus, as both in size and form it is more nearly allied to our *C. orientalis*, Schleg., and the *C. turdoides* of Europe than to any others of the *Salicariæ* that I am acquainted with. Its hind toe is much shorter than that of *C. orientalis*, and its hind claw smaller; its tail is much more graduated, each feather ending in a long projecting tip. Perhaps no birds puzzle the classifier so much as do the different species of Reed-birds. Almost each species may be regarded as occupying a section of its own. I do not of course in this include races of the same form from different localities, which have been ranked as species, as, for instance, the *Calamoherpe turdoides*, and its eastern representative, the *C. orientalis*. It is just as well for the facility of determination that such birds should be separated, and this cannot well be done without the trinomial nomenclature, unless subgenera are formed for their specific reception. As naturalists are so averse to admit the double specific name (one of the species, and the other of the locality whence any bird is derived, which shows a sufficient variation to entitle it to be noted, though scarcely strong enough to permit of its being styled a separate species), we must continue forming subgenera,—though, in

my opinion, with regard to the Reed-birds, and to several other groups, double specific names might almost be allowed. We will not now, however, attempt to propose a new subgenus for the reception of this new species; but only point out that, in the character of its tail, this bird is not a typical *Calamoherpe*, if we regard *C. turdoides* as the type.

♂. Length 7·5; wing 3·3; tail 2·7; bill, along culmen, ·7; tarsi 1·1; hind toe and claw 7·5.

♀. Length 7·2; wing 3·1; tail 2·7.

The five lateral rectrices much graduated, all strongly mucronate; first primary quill broad, pointed, and short; the second about one-twelfth shorter than third, which is the longest in the wing.

Bill deep brown on upper mandible and apical half of lower, pale on the edges of both; basal half of lower ochreous, becoming brighter yellow on the rictus, base, and basal edge of upper; inside of mouth bright yellow; legs and claws deep flesh-brown; upper plumage dusky chestnut-brown, tinged with olive, ruddier on the back, wings, and tail; a whitish streak runs over the eyes; throat, centre of breast, and belly white; cheeks and lower neck smoke-grey; sides of breast, axillæ, flanks, and vent brownish buff; irides chestnut-brown.

A younger bird had the bill deep greyish brown on culmen, bluish grey on gonys, with the rest of the bill pale flesh-colour, yellowish at base and rictus; inside of mouth pale yellow; legs and claws light yellowish or flesh-brown; the under parts have less smoke-grey and buff, and the upper parts are lighter.

All the specimens have several thread-like filaments proceeding from the ends of the occipital feathers. This peculiarity is more observable in the *Drymoicæ* and *Priniæ* than perhaps in any other group of Warblers. I have of this species eight specimens, all procured at Amoy in May 1861.

CALAMODYTA SORGHOPHILA, n. sp.

This Sedge-Warbler, of which I procured only one specimen at Amoy in May 1861, is smaller than the Continental *C. aquatica*, and more nearly resembles the British *C. phragmitis*, L., from which it differs in the form of its wing, and almost in the unspotted appearance of its upper parts. Upper mandible of bill blackish brown, edge of upper and whole of lower yellow-ochre; rictus and inside of mouth yellow; irides ochreous brown; legs and toes plumbeous, with paler soles; upper parts ochreous olive, with a few rather faint streaks of blackish brown; eyebrow and cheeks ochreous, more buff-coloured on the lores; over the eyebrow a black streak marks each side of the head; under parts yellowish buff, much paler on the throat, under neck, and centre of belly; wing-coverts and tertiaries deep hair-brown, margined with ochreous olive; quills hair-brown, edged with light chestnut-brown; tail pale hair-brown, margined with reddish olive, which colour also tinges the rump; inner edges of the under wing edged with very pale rusty ochre.

Length 4·6; wing 2·23; tail 1·88; tarsi ·7; bill, along culmen, ·42.

First quill very small, narrow, and pointed, about ·34 long; second quill ·28 shorter than the third and fourth, which are equal and longest; the fifth quill ·15 shorter than the third and fourth; the sixth ·22 shorter than the fifth. Tail much graduated, the *rectrices* being narrowed at their tips; tarsi thick; toes and claws strong, the hind toe and claw especially so.

LOCUSTELLA MACROPUS, n. sp.

The Grasshopper-Larks, when procured, are the easiest of all the Reed-birds to distinguish. For if there is any doubt from their external appearance, one has only to examine the tibial tendons. In all three species procured at Amoy, these have proved quite rigid, like those of gallinaceous birds. Mr. Blyth tells me this holds good in the *L. rubescens* of India, and I expect it will be found also so in the European species. It was first brought to my attention by an intelligent Chinese bird-stuffer I used to employ, who was rather astonished to find them so hard as to blunt his scissors. I have, curiously enough, three good species of *Locustella* from Amoy. One, a male of a very richly coloured species, was procured in our garden on the 2nd September, and is evidently a winter visitant to South China. This turns out, as I had expected, to be *L. ochotensis* (Midd. Siber. Reise), from the Amoor and North Japan (Capt. Blakiston). The other two are both summer birds with us, being generally found about in May. The first of these, shot 31st May, 1861, at Amoy, approaches nearer to *L. raii*, but can at once be distinguished by its much larger feet.

Length 5·1; wing 2·3; tail 2; bill, along culmen, ·41; tarsi ·68.

Bill blackish brown on upper mandible; edge of upper and greater part of lower pale flesh-colour; gonys, near tip, brownish and darker flesh-coloured; rictus and inside of mouth pale yellow; legs, toes, and claws very pale yellowish flesh-colour.

First quill minute; second quill rather shorter than third, which is longest. Tail soft and graduated. Our single specimen has only a very few faint spots on the breast, with none on the flanks and under tail-coverts. In point of colouring it is very similar to some phases of the dress of the European *Locustella*, of which it is in fact the Eastern representative.

LOCUSTELLA MINUTA, n. sp.

This again is allied in colouring to the *L. raii*, but is a very diminutive species, strongly marked and spotted; it may perhaps turn out to be a resident species in South China. I have one, shot at Amoy on 18th May, 1861; and Capt. Blakiston procured a pair in Canton in October. The Canton birds are strongly washed with yellow, and are therefore, I presume, birds of the year.

Length 4·7; wing 2·15; tail 1·6, the feathers much graduated; tarsi ·65; bill, along culmen, ·38, to gape ·6.

Bill blackish brown on the culmen and the small apical part of

the gonys; the rest of it and inside of mouth pale yellowish flesh-colour; legs and toes large and thick; claws thin and pointed, hind claw long and Pipit-like, all of a deep brownish flesh-colour, with paler edges and soles.

First quill diminutive; second one-twelfth shorter than third, which is longest. Colouring similar to *L. raii*, and perhaps as variable, according to the stage of its plumage.

I have a few other novelties, perhaps more interesting than the above, from China, but I have not now leisure to add them to this list; I must therefore reserve them for a future paper.

3. Notice of the Chanco or Golden Wolf (Canis chanco) from Chinese Tartary. By Dr. J. E. Gray, F.R.S., F.L.S., F.Z.S., etc.

Lady Augustus Hervey has kindly presented to the British Museum a fine specimen of the skin of a Wolf, which was shot by her brother, Lieut. W. P. Hodnell, of H.M.'s 54th Regiment, with several other animals, such as the large *Ovis ammon*, in Chinese Tartary.

It is a very showy animal, rather larger than the common European Wolf.

I do not find it noticed either in Pallas's 'Zoographia Rosso-Asiatica,' published at St. Petersburg in 1831, or in Dr. Leopold v. Schrenck's 'Reisen und Forschungen im Amur-Lande in den Jahren 1851–56,' published at St. Petersburg in 1858, unless they regard it as a variety of the Common Wolf (*C. lupus*).

The Russians in Eastern Siberia call a Fox (*Canis alpinus*) (figured by Schrenck, t. 2) the *krasnoi Wolk*, that is, Tawny Wolf.

Canis chanco.

Fur fulvous, on the back longer, rigid, with intermixed black and grey hairs; the throat, chest, belly, and inside of the legs pure white; head pale grey-brown; forehead grizzled with short black and grey hairs.

Hab. Chinese Tartary. Called *Chanco*.

The skull is very like, and has the same teeth as, the European Wolf (*C. lupus*). The animal is very like a Common Wolf, but rather shorter on the legs; and the ears, the sides of the body, and outside of the limbs are covered with short pale fulvous hairs.

The length of its head and body is 42 inches; tail 15 inches.

4. Notice of a New Species of Chameleon sent from Khartoom by Mr. Consul Petherick. By Dr. J. E. Gray, F.R.S., F.L.S., F.Z.S., etc.

This species is very like *Chamæleo senegalensis*; but the scales on the ridges of the head and the ridges of the back are of the same size as those of the neighbouring parts, and therefore do not form

any appreciable crest. The occiput is rather differently shaped, the hinder central keel being a little more prominent. The scales of the head, body, limbs, and tail are smaller and less raised. The limbs are longer and more slender.

This species is very different from the *Chamæleo affinis* of Rüppell, (which is the *C. abyssinicus* of the Berlin Museum), from Abyssinia, which differs from both *C. senegalensis* and *C. lævigatus* in the scales being much larger and more convex, and in the scales of the ridges of the head and back being larger than those on the neighbouring parts, so as to form distinct crests; and in *C. affinis* the body is grey or blackish, with two or three broad, irregular-shaped, opake-white spots, forming an interrupted streak on each side of the back of the animal.

This species may be thus described:—

CHAMELEO LÆVIGATUS.

Grey or bluish in spirits. Scales small, flat, subequal, uniform; dorsal line, nearly smooth, scarcely crested. Belly with a crest of larger acute white scales. Occiput slightly raised in the centre by a slight keel; the superciliary ridges and the central keel scarcely dentated. The legs elongate, very slender.

Hab. Khartoom.

5. NOTES ON TWO NEW SPECIES OF MAMMALS. By J. K. LORD, F.Z.S., NATURALIST TO THE BRITISH NORTH-AMERICAN BOUNDARY COMMISSION.

My principal reason for bringing to your notice this evening two animals, a Musk Rat and a *Lagomys*, that I propose making new species, is to elicit from the zoologists who are before me opinions on that most debatable of all debatable questions, Where does well-marked variety end, and species begin? Is it enough if you have decided differences of habit, size, colour, and locality—variations that are always constant, but without well-defined *structural* differences, or these, if any, but trivial in character; or must there of necessity be decidedly marked variations in *structure*, particularly in the skull and dental formulæ, as well as in habit, colour, size, and habitat, to constitute a species? I now have on the table four animals, two of which are described and figured, and two I believe specifically distinct from the former; and although the latter, as I shall be able to point out to you, present differences of habit most singularly well marked, strongly defined differences of size and colour, habitat, and range, yet an examination of their skulls shows only some slight differences, principally in size.

First, then, of the Musk Rat. The one which I believe is the well-known *Fiber zibethicus* (Cuv.) makes its holes in the clayey banks of streams and pools where the water runs slowly. The entrance is always below the surface of the water; the hole is dug up in a slanting direction till above the water-level. A stage or flat place is

then cleared, which constitutes his dining-, drawing-, and bed-rooms; leading to the entrance of his mansion are a large number of open cuttings, running in all directions, cut or dug in the mud at the bottom of the water. When foraging about, as he usually does about twilight, if alarmed, he dives at once into one of these cuttings, and, rushing rapidly through it, stirs up the mud, and so fouling the water, completely and effectually conceals himself.

The other Musk Rat, which I propose to make a new species, and to call *Fiber osoyoosensis*, having obtained it at a large lake (Lake Osoyoos), situated between the Cascades and Rocky Mountains, and through which the boundary-line (the 49th parallel of latitude) runs, differs in size, in colour, in locality, but particularly in habits, from the preceding.

This fellow chooses as his haunt a clear pond or lake, and in water from 3 to 4 feet deep constructs a house of bullrushes, in form conical, built up from the bottom—how, I am at a loss to imagine,—the roof cleverly arched over into a domed shape, and raised about a foot above the water. Up in this dome, skilfully constructed, is his suite of apartments, the entrance to which is far below the surface of the water. His habits very nearly approximate those of the Beaver: he swims about boldly in the day-time, but dives rapidly on the approach of danger. If a dead or badly wounded duck be left on the pool, it is at once seized on, towed into the house, and devoured.

I am quite satisfied, from careful observation, that the Musk Rat is a carnivorous beast whenever he has a chance; and the straight, sharp-cutting, strong incisor teeth are well adapted for the indulgence of such cannibal propensities.

If there were no rushes growing where the mud-rover lived, it might be assumed that he dug a hole into the bank from lack of material to build a house; but I have often seen the rushes growing abundantly where he has chosen his mud hut, offering every facility for architectural pursuits, had he so willed. On the other hand, had the rush-builder been precluded from finding a mud-bank in which to construct his mansion, it might have been supposed that he had resorted to making a hut with rushes on that account.

This *Lagomys*, which I propose making a new species, and calling, from its being so much less than any other, *Lagomys minimus*, lives on the summit of the Cascade Mountains, at an altitude above the sea-level of about 7000 feet. He chooses as his residence loose piles of rocks and stones. He is shy and wary, and on the slightest noise takes a header into a crevice. When everything is again still and quiet, he cautiously peeps out, and, growing bold in the silence, climbs up on the top of a stone, and, sitting on his hind legs like a begging dog, gives a sharp shrill cry; and so curiously deceptive is it that I constantly imagined the sound was far distant when it has been close to my feet. It was in October, when I was on Ptarmigan Hill, a high mountain in the Cascade range; the snow was just beginning to fall; and all these little fellows were then busily employed in making large nests, in the crevices between the stones, of dry grass and leaves,

evidently for their winter sleep, and perhaps store-house. I should have made much more extensive observations, had not the prospect of coming snow driven me down.

This *Lagomys*, which is much larger, and which I believe to be the same as the one described and figured by Sir J. Richardson (pl. 19) as *Lepus* (*Lagomys*) *princeps*, I first saw at Chilukweyuk Lake, a large lake on the west side of the Cascades, close to the boundary-line, and next on the trail leading from Fort Hope on the Fraser River to Fort Colville on the Columbia, both fur-stations of the Hudson Bay Company. The animals were in a narrow gorge, among large heaps of loose stones that had rolled down from the high precipitous sides of the gorge. I saw them busily feeding on grass, much after the fashion of a rabbit, eating a few mouthfuls, then stopping and sitting up and quietly taking a survey of things in general. At this period, later in the year, about the same date on which in the year preceding I had seen *Lagomys minimus* making its nest, not a trace of a nest could I see, nor any evidence of an attempt to make one. It was at the same period of the year, and about the same altitude, that I saw this *Lagomys* at Chilukweyuk Lake; but no nest, nor a shadow of an attempt to construct one, was there to be seen. Early in October I returned again by the trail I had used in going from Fort Colville to Fort Hope; the snow had fallen to about the depth of 6 inches, completely covering up the rocks and stones. All the little fellows had disappeared, and, although I searched most carefully, there was not a hole nor track in the snow to show they had ever left their quarters. It was quite impossible a nest could have been made in the interim; hence I feel perfectly sure they hybernate in deep holes without a nest, whereas *Lagomys minimus*, living at a much greater altitude, makes a large nest of hay to pass his winter sleep in.

The two new animals may be described as follows:—

FIBER OSOYOOSENSIS, Lord, sp. nov.

Sp. char.—In total length 3¾ inches shorter than *Fiber zibethicus* (Cuv.); in general size much smaller. General hue of back jet-black; but, the hair being of two kinds, if viewed from tail to head it looks grey—the under fur being fine, silky, and light grey in colour; concealing this on the upper surface are long coarse black hairs; the belly and sides somewhat lighter; head broad and depressed; neck indistinct; ear small, upper margin rounded; eye small and black; the feet, legs, and claws are so exactly like those of *Fiber zibethicus* that it would be useless to describe them again; whiskers long, and composed of about an equal number of white and black hairs; incisors nearly straight, on the external surface orange-yellow.

The skull differs from *Fiber zibethicus* in being much smaller, 2⅛ inches in length, 1⅛ inch in width, very much shorter from the anterior molar to incisors; nasal bones much more rounded at their posterior ends, the superior outline less curved; postorbital process not nearly so much developed; the cranial portion of the skull in its upper outline is much less concave, and smoother; superior out-

line of occipital bone not so prominent or strong; incisors shorter and much straighter; molars much smaller, but in general outline similar.

LAGOMYS MINIMUS, Lord, sp. nov.

Sp. char.—Differs from *Lepus* (*Lagomys*) *princeps* of Sir J. Richardson (F. B. A., i. p. 227, pl. 19) in being much smaller. Predominant colour of back dark grey, tinged faintly with umber-yellow, more vivid about the shoulders, but gradually shading off on the sides and belly to dirty white; feet white, washed over with yellowish brown; ears large, black inside, the outer rounded margin edged with white; eye very small and intensely black; whiskers long, and composed of about an equal number of white and black hairs.

Measurement: Head and body 6½ inches; head 2 inches; nose to auditory opening 1¼ inch; height of ear from behind 1 inch.

The skull differs in being generally smaller; the cranial portion of the skull in its superior outline is much narrower and smoother. The nasal bones are shorter and broader, and rounded at their posterior articulation, instead of being deeply notched as in *L. princeps*. Distance from anterior molar to incisors much less; auditory bullæ much smaller. Incisors shorter and straighter, and very deeply grooved on the anterior surface. Molars smaller, but otherwise similar in form. Length of skull 1¼ inch.

General differences from *Lagomys princeps*—*First*, in being smaller, 1½ inch shorter in total length; the ear, measured from behind, ¼ inch shorter: the colour generally darker, especially the lower third of the back.

Secondly, in the *structural* differences of the skull; for although these differences are not prominent or well defined, yet they are unquestionable variations.

Thirdly, in the habit of constructing a nest of hay for the winter sleep, and in living at a much greater altitude.

6. ON THE AMERICAN SPINE-TAILED SWIFTS OF THE GENUS CHÆTURA. BY P. L. SCLATER, M.A., PH.D., F.R.S., SECRETARY TO THE SOCIETY.

(Plate XIV.)

Through the kindness of Professor Baird, of the Smithsonian Institution, Washington, I have lately received for examination a specimen of *Chætura vauxi*—the Western Spine-tailed Swift of North America. I have long wished to see an authentic example of this Swift, in order that I might compare it with Mexican skins in my collection which I had referred, not without considerable misgivings, to this species. Upon comparison I find that the skin transmitted by Professor Baird, which was obtained by Dr. C. B. Kennerly when engaged on the North-Western Boundary Survey at Simiahmoo, in July 1852, agrees closely with mine, and I have no doubt of its being of the same species. The range of this bird, therefore, appears



M & N Hanhart, imp.

1. CHÆTURA CINEREIVENTRIS
2. — GASSINII.

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to extend from British Columbia through Mexico into Guatemala, where examples were obtained by Mr. O. Salvin.

I take this opportunity of giving a short synopsis of the American species of the genus *Chætura**, which may be distinguished in the following way:—

Div. A. Hemiprocne. Majores (long. corp. maj. quam 6 poll.).

Major; torque postico, angusto, albo ..... 1. *semicollaris.*
Minor; torque undique, latiore, albo ..... 2. *zonaris.*

Div. B. Chætura. Minores (long. corp. min. qu. 6 poll.).

Torque rubro ..... 3. *rutila.*
Torque nullo:
- dorso æneo-nigro, uropygio vix pallidiore ..... 4. *pelasgia.*
- uropygio fuliginoso:
  - gutture albo: pect. obscuriore 5. *vauxi.*
  - gutt. et pect. fuliginosis ..... 6. *poliura.*
- uropygio cinereo ..... 7. *cinereiventris.*
- uropygio albo ..... 8. *spinicauda.*

The synonymy of the species stands nearly as follows:—

A. Hemiprocne.

1. Chætura semicollaris.

Acanthylis semicollaris, De Saussure, Rev. Zool. 1859, p. 118.
Chætura semicollaris, Sclater, Cat. Am. B. p. 282.

Nigra; semitorque postico angusto, albo.
Long. tota 10, alæ 10, caudæ 3, poll. Angl.
Hab. Mexico.
Mus. P. L. S.

This fine Swift is easily distinguishable from *C. zonaris* by its larger size, and the entire absence of any traces of a white collar below. M. de Saussure has not vouchsafed to inform us in what part of Mexico he procured it. My specimen was obtained by exchange from the Geneva Museum.

2. Chætura zonaris.

Hirundo zonaris, Shaw, in Mill. Cim. Phys. pl. 55.
Hirundo albicollis, Vieill. Nouv. Dict. xiv. p. 524, et Gal. Ois. pl. 120.
Acanthylis albicollis, Sclater, P. Z. S. 1854, p. 10, et 1858, p. 59.
Cypselus collaris, Max. Beitr. iii. p. 344; Temm. Pl. Col. 195.
Hemiprocne collaris, Nitzsch, Pterylogr. p. 123.
Pallene collaris, Boie, Isis, 1844, p. 168.
Hemiprocne zonaris, Sclat. et Salv. Ibis, 1860, p. 37; Cab. et Heine, Mus. Hein. iii. p. 84.
Acanthylis collaris, Gray, List Spec. Fiss. p. 15; Bp. Consp. p. 64; Burm. Syst. Ueb. ii. p. 364.
Chætura zonaris, Sclater, P. Z. S. 1861, p. 79, et Cat. Am. B. p. 282.

Fusco-nigra; torque undique, lato, albo.
Long. tota 9·0, alæ 9·0, caudæ 2·5.

* I think it doubtful whether Temminck's *Cypselus senex* (Pl. Col. 397) is to be referred to this genus or not. Bonaparte says "*rectricibus minimè mucronatis, sed rigidis*" (Consp. p. 65). I have no example of this species.—P. L. S.

Hab. South America, from the La Plata northwards, and through Central America to Guatemala; Jamaica (*Osburn*); St. Domingo (*Sallé*).

Mus. Brit., P. L. S., &c.

B. Chætura.

3. Chætura rutila.

Hirundo rutila, Vieill. Nouv. Dict. xiv. p. 528, et Enc. Méth. p. 534.

Acanthylis rutila, Sclater, P. Z. S. 1855, p. 135.

Chætura rutila, Sclat. et Salv. Ibis, 1860, p. 37, pl. 3. f. 1 (♂), 2 (♀); Sclat. Cat. Am. B. p. 283.

Hirundo robini, Less. Tr. d'Orn. i. p. 270.

Chætura brunneitorques, Lafr. Rev. Zool. 1844, p. 81; Bp. Consp. p. 64.

Nigricanti-fuliginosa, subtus dilutior; torque maris undique, rubro, fœminæ nullo.

Long. tota 4·5, alæ 5·0, caudæ 2·0.

Hab. Guatemala (*Salvin*).

Mus. P. L. S.

Said to have been procured by M. Robin in Trinidad, and by Lafresnaye described as from New Granada, but more certainly from Guatemala, where Mr. Salvin obtained his specimens personally.

4. Chætura pelasgia.

Hirundo pelasgia, Linn. S. N. i. p. 345; Wils. Am. Orn. v. p. 48, pl. 39. f. 1.

Chætura pelasgia, Steph. Gen. Zool. Birds, xiii. p. 76; Baird, B. N. Am. p. 144; Sclat. Cat. Am. B. p. 282.

Acanthylis pelasgia, Bp. Consp. p. 64; Cass. Ill. B. Cal. i. p. 241.

Hemiprocne pelasgia, Streubel, Isis, 1848, p. 363.

Fuliginosa; gutture pallidiore; supra æneo tincta, uropygio paulo dilutiore.

Long. tota 4·7, alæ 5·0, caudæ 1·8.

Hab. Eastern United States of North America.

5. Chætura vauxii.

Cypselus vauxii, Towns. Journ. Acad. Philad. viii. p. 148.

Acanthylis vauxii, Bp. Compt. Rend. xxxviii. p. 660, Notes Delattre, p. 90, et Consp. p. 64; Cass. Ill. B. Cal. i. p. 250.

Chætura vauxii, Baird, B. N. Am. p. 145; Sclat. Cat. Am. B. p. 282.

Chætura ——?, Sclat. et Salv. Ibis, 1860, p. 37.

Fuliginosa; dorso et capite æneo tinctis; uropygio pallidiore; subtus gutture albo, ventre obscure fuliginoso, gulam versus sensim dilutiore.

Long. tota 4·3, alæ 4·7, caudæ 1·5.

Hab. Western North America, from British Columbia south through Mexico to Guatemala.

Mus. P. L. S.

Readily distinguishable from *C. pelasgia* by its smaller size, paler rump, nearly white throat, and lighter under parts. *C. poliura*, which somewhat resembles it, is blacker on the back and head, and much darker below.

6. CHÆTURA POLIURA.

Cypselus poliourus, Temm. Tabl. Méth. p. 78 (ex Buff. Pl. Enl. 726. f. 2).
Acanthylis cinereicauda, Cass. Proc. Acad. Philad. 1850, p. 58.
Cypselus pelasgius, Max. Beitr. iii. p. 347.
Acanthylis oxyura, Burm. Syst. Ueb. ii. p. 366.
Acanthylis polioura, Bp. Consp. p. 64.
Chætura poliura, Sclater, Cat. Am. B. p. 283.

Supra æneo-nigra; uropygio et tectr. caudæ sup. fuliginosis; subtus fuliginosa, gutture albicantiore.
Long. tota 4·2, alæ 4·8, caudæ 1·8.
Hab. Cayenne and Brazil.
Mus. P. L. S.

One of the specimens of this species in my collection is said to be from Brazil; but the other is certainly from Cayenne, and Buffon describes the species as from that country. I have compared my examples with the type of Mr. Cassin's *A. cinereicauda*, and can vouch for their identity. It is perhaps doubtful whether Buffon's figure was not really intended for *C. pelasgia*, in which case this bird should bear Mr. Cassin's name—*cinereicauda*.

7. CHÆTURA CINEREIVENTRIS. (Pl. XIV. fig. 1.)

Cypselus acutus, Max. Beitr. iii. p. 351 (nec auct.).
Acanthylis spinicauda, Burm. Syst. Ueb. ii. p. 366.
Chætura cinereiventris, Sclater, Cat. Am. B. p. 283.

Æneo-nigra; uropygio et corpore subtus cinereis; crisso nigricante.
Long. tota 4·3, alæ 4·2, caudæ 2·8.
Hab. South-eastern Brazil.
Mus. P. L. S.

The cinereous uropygium and body beneath render this Brazilian bird very easily recognizable on comparison with its congeners, though it has been hitherto always confounded with one or other of them.

8. CHÆTURA SPINICAUDA.

Cypselus spinicaudus, Temm. Tabl. Méth. p. 78 (ex Buff. Pl. Enl. 726. f. 1).
Hirundo pelasgia, var., Lath. Ind. Orn. ii. p. 581.
Acanthylis spinicauda, Boie, Isis, 1826, p. 971; Bp. Consp. p. 64.
Chætura spinicauda, Sclater, Cat. Am. B. p. 283.

Nigra; fascia uropygiali alba; subtus albicanti-fuliginosa; pectore indistincte nigro vittato.
Long. 3·7, alæ 3·9, caudæ 1·6.
Hab. Cayenne.
Mus. P. L. S.

I have little doubt that this bird is the true "*Hirondelle à queue pointue de Cayenne*" of Buffon. It is easily distinguishable from all the others by the white band across the rump. I have two examples, both from Cayenne.

April 21, 1863.

E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

The Secretary read the following letter, which had been addressed by Mr. Williams, H. B. M. Consul at the Samoan Islands, to Mr. George Sprigg of Melbourne, in reply to letters of inquiry respecting the possibility of obtaining living examples of the *Diduncului strigirostris*:—

"British Consulate,
Apia, Upolu, Samoa,
19th November, 1862.

"My dear Sir,—I have the pleasure to acknowledge the receipt of your favour, dated April 8th, 1862, with its inclosures. In reply, I would say that I have been over twenty years trying to get one of the birds you write about, and have just, within the last two months, been fortunate enough to secure *one*, which is now thriving well; and I hope that when I go to Sydney I shall be able to take it with me. Although, for myself, I should rather favour the Sydney Acclimatization Society, yet, as you have first written to me about the bird, I should think it only just to give you the first offer. I have had great difficulty in obtaining the bird; for they are nearly extinct, having been destroyed by the wild cats. The Rev. J. B. Stair's account of the bird is very correct.

"I hope to be in Sydney about May or June, when I shall be happy to hold any further communication with you, and, with kind regards,

"I am,
"My dear Sir,
"Yours very truly,
(Signed) "John C. Williams."

"*To Mr. George Sprigg,*
Melbourne."

Dr. Sclater also read the following extracts from a letter addressed to him by Dr. G. Bennett of Sydney, F.Z.S., dated January 19, 1863, referring to the same subject:—

"I have now to send you all the information I have collected respecting that rare bird the *Diduncului*, to bring before the Society. I mentioned in a former letter that I had made arrangements with a gentleman about to visit the Navigators' Islands to procure me

information respecting the existence of this bird, and, if possible specimens, dead or alive. I also gave him an accurately coloured drawing of the bird, copied from Gould's 'Birds of Australia.' On the 26th of December 1862, I received the following letter from him, dated from Apia, Navigators' Islands, November 1862 :—

"'Dear Sir,—According to my promise, immediately on landing, I made inquiries concerning the 'Manu Mea,' the result of which you will find detailed below. From inquiries made of the natives, I find that on this island (Upolu) the bird, if not totally, is almost extinct. Mr. Williams, the British Consul, had one, which he purchased for six dollars (25*s*.). I found, in the course of conversation, that a few might be found on the mountains at the island of Savaii, an island about thirty miles to the leeward of this place; and on mentioning the kind of bird to a gentleman here of the name of Trail, he told me that he knew of a bird answering the description and drawing in the possession of a native on Savaii, which he would procure and send to Sydney by the schooner 'Mechanic,' not having time to procure it before my departure, for £5. You will think the price high; but recollect that there are many scientific people who have been inquiring here and offering large sums for the bird.

"'I am, dear Sir,

"'Yours truly,

"'J. O'Hea.'

"On the 7th January Mr. O'Hea arrived in Sydney, and informed me that he had countermanded the bird, when procured, from being sent by any vessel until the return of his vessel (the 'J. K. Beatson') in two months, as he had ascertained the 'Mechanic' might not call at Savaii. He informs me that the *Didunculus* in Mr. Williams's possession is a very young bird, with the teeth of the mandible not well developed; it ran rapidly about the cage on any one looking at it, being very wild and not accustomed to confinement, and it was obliged to be driven in a corner of its cage to enable the spectator to have a good view of it. It had then been in Mr. Williams's possession only about six weeks. It is not now found at Upolu; but in the island of Savaii, the largest and most mountainous island of the group, it is thought it may still be procured, but is very rare.

"The natives were surprised at the great interest taken in the bird; and the numerous inquiries and large prices offered will lead them, I have no doubt, to place almost a prohibitory price upon it. Captain M'Leod has also sailed for the Navigators' group, and has also a drawing of the bird, and will make every exertion to procure it. I have not limited him to any reasonable price, and I shall not object to give £5 to £10 a pair even for skins, as I expect the bird is nearly extinct, or only to be procured with great difficulty."

A letter was read from Ronald Gunn, Esq., Corr. Memb., dated Launceston, Jan. 19th, 1863, announcing the shipment of a living female Thylacine (*Thylacinus cynocephalus*) with three young ones for the Society. Mr. Gunn stated, with reference to this animal :—

"Like most of our animals, the Thylacine is nocturnal, inhabiting the remoter parts of the colony, and ascending to the tops of our mountains at an elevation of some 4000 feet above the sea. You need not, therefore, treat them as tender, as they are exposed to both frost and snow in our winter season, although, from the wooded character of our island, the shelter is very great and the cold necessarily much modified as compared with the climate of Britain,—our annual mean temperature being about 54°·92, the mean of the hottest month being about 63°·57, and of the coldest 45°·82. These temperatures are, however, from Hobart-Town observations; but the haunts of the Thylacines are where the temperature is much lower.

"They, invariably, will eat only what they kill, and that *fresh*; so that after killing a sheep they never (or very rarely) return to the dead carcase, but kill another. Hence it has been found impossible to kill them by means of strychnine and other poisons, as has been desired by our sheep-owners. In confinement, however, I have found them eat the meat furnished to them with avidity.

"The present one, in giving suck to its young, used to lie down like a dog, the skin of the pouch being thrown back so as to admit of the young ones getting easily at the teats. When alarmed, the young ones crawled in with their backs downwards, the mother assisting by lowering her hind quarters to facilitate their getting in; and by also placing her rump against the side of her cage to give the cubs a purchase with their hind legs against the cage, and thus push themselves in. They were so large when they left this, that when all in the pouch it hung down very low, and seemed almost a deformity."

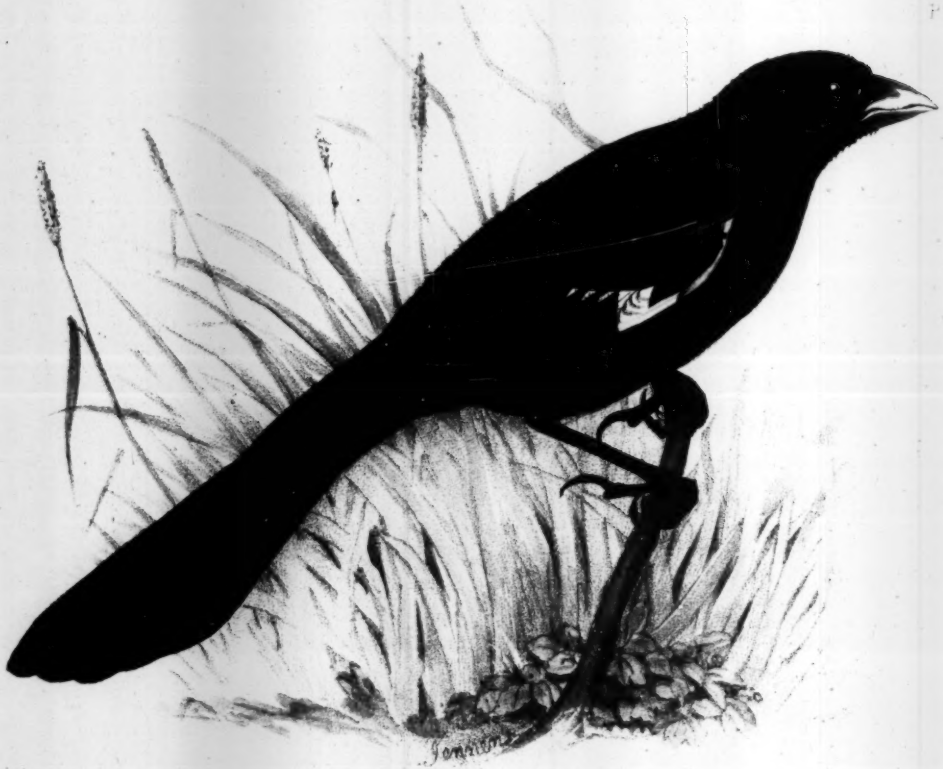
The Secretary reported the arrival in the Society's Gardens, on the 31st of March, of a fine collection of birds from India, partly presented to the Society by the Babu Rajendra Mullick of Calcutta, and partly deposited in the Gardens by Mr. John J. Stone and the Rev. William Smythe. The collection shipped at Calcutta had consisted of fifty birds, thirty-five of which had reached the Gardens in safety, and the greater part of them in excellent condition, namely—

9 Horned Tragopans (*Ceriornis satyra*), 6 males, 3 females.
4 male Impeyans (*Lophophorus impeyanus*).
4 male White-crested Kaleeges (*Gallophasis albocristatus*).
1 male Cheer (*Catreus wallichii*).
1 male Pucras (*Pucrasia macrolopha*).
12 Hardwick's Spur-fowl (*Galloperdix lunulosa*).
1 male Polyplectron (*Polyplectron chinquis*).
3 Hornbills (*Buceros pica*).

The Secretary stated that the Society were greatly indebted to Mr. Stone for the arrangements he had made in facilitating the transport of these birds by the overland mail from Calcutta.

The following papers were read:—

BRITISH
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MUSEUM



Hanhart imp.

1. On some Birds collected by Capt. J. E. Speke at Kazeh in Eastern Africa. By Dr. G. Hartlaub, For. Memb.

(Plate XV.)

[Of the collections spoken of by Capt. Speke in his letter addressed to me from Kazeh, read to the Society on the 13th January last (see *anteà*, p. 1), only one box of birds and the sketches have as yet reached me. I have sent the birds to my friend Dr. Hartlaub, our best authority on African ornithology, for his examination; and the present paper gives the results of his investigations.—P. L. S.]

1. Melierax musicus (Daud.).
2. Hypotriorchis semitorquatus (Smith).
3. Halcyon variegata (Vieill.).
4. Halcyon senegalensis (L.).
5. Merops erythropterus, Gm.
6. Irrisor cyanomelas (Vieill.), av. juv.
7. Crateropus jardinii, Swains.
8. Basanistes cissoides (Licht.).
9. Prionops poliocephalus, Stanl.
10. Bradyornis spekei, n. sp. *Supra ex olivaceo rufescens, capite subcinerascente; alis et cauda cinnamomeo-rufis, subalaribus dilute fulvis, remigibus majoribus in dimidio apicali pogonii interni oblique fusco-nigricantibus; fascia gulari e maculis nigricantibus composita, utrinque ad angulum oris usque elongata; subtus isabellino-fulva, pectore cinerascente; subcaudalibus fulvis; pedibus et rostro nigris.*

Long. 7½″, rostr. a fr. 6‴, al. 3″ 5‴, caud. 3″ 9‴, tars. 13‴.

A typical species, allied to the western *B. ruficauda*; tail long; feet rather large; beak rather slender; tertiaries nearest to the body all rufous; forehead and ocular region more rufescent.

I propose to name this fine new species after its zealous discoverer, Capt. Speke. It was collected at Meninga, and is figured in his sketches under the name of the "Morning Warbler;" the irides are described as of a light straw-colour.

11. Dryoscopus funebris, n. sp. *Ex ardesiaco niger; alis et cauda purius nigris, nonnihil fuscescentibus; uropygii plumis longis, laxis, albo variegatis; rostro et pedibus nigris.*

Long. circa 8″, rostr. a fr. 9½‴, al. 3″ 7‴, caud. 3½″, tars. 14‴.

This species is nearly allied to the western *D. carbonarius*, but is smaller, and may be distinguished by its more slender and more compressed beak, and by the *iron-greyish* shade of its black colour. There is no doubt about its being new.

Capt. Speke names this bird the "Black Metal-toned Whistler," and gives *Meninga* as its locality.

12. Dryoscopus hamatus, n. sp. *Supra niger, nitore nonnullo chalybeo; uropygii plumis longis, sericeis, albis; subtus albus; subalaribus et subcaudalibus albis; tectricibus alarum et remigibus, primo et secundo exceptis, albo limbatis; rostro gracili, valde compresso, maxillæ apice uncinato, nigro; pedibus nigris.*

Long. circa 5″ 10‴, rostr. a fr. 8‴, al. 3″, caud. 2½″, tars. 10‴.

13. Estrelda phœnicotis, Sw.

14. Estrelda minima, Vieill. (mutilated skin, the head wanting).

15. Spermestes cucullata, Sw.

16. Euplectes flaviceps, Sw.

17. Vidua paradisea (L.).

18. Vidua macroura (Gm.).

19. Vidua eques, n. sp. (Pl. XV.) *Minor, nigra; macula scapulari majuscula, rufo-cinnamomea; subtus late nigro-marginata; margine axillari flavo-rufescente; subalaribus albis; remigibus omnibus basi niveis, speculum alarem formantibus; rostro margaritaceo, basi supra et infra plumbeo; pedibus nigris.*

Long. tota 6½″, rostr. a fr. 6‴, al. 2″ 9‴, caud. 3″ 6‴, tars. 9‴.

This fine and apparently undescribed species belongs to the division *Urobrachya*. It is one of the smallest of the whole group, and appears to be nearly related to the *U. albonotata* of Cassin, which, however, has the scapular spot of a pure rich yellow.

20. Treron nudirostris (Sw.).

21. Columba guinea, Linn.

22. Dendrocygna viduata (Linn.).

2. Descriptions of several New Species of Worms belonging to the Annelida errantia and sedentaria or tubicola of Milne-Edwards. By W. Baird, M.D., F.L.S.

The following very interesting species of Annelides were collected by Mr. Lord, during the time he was engaged as naturalist on the N.W. American Boundary Commission. They appear to me to be undescribed. They will be figured in the forthcoming report of the labours of the commission.

1. Lepidonotus insignis, Baird.

This is a very fine species of the genus *Lepidonotus*. It is rather more than 3 inches long, and is nearly ½ an inch in breadth, exclusive of the setæ of the feet. On the upper surface, the body is of a whitish colour, marbled with black. The sides, which are covered by

the elytra, are white, and a broad black line runs down the centre of the dorsum throughout its whole length. The feet are encircled with fine black circular lines. The elytra, eighteen pairs in number, are oval, white, with black dots on the outer sides and centre, and they are marked with a black semicircular patch on the inner edge. They do not overlap each other, except near the head. On the body of the animal they are wide apart, leaving the centre of the back exposed. The under surface is of a bluish-black colour, with a narrow white line running down the centre. The proboscis is large and wrinkled, and the jaws are of a reddish-brown colour. The antennæ are five in number, the central one being nearly three times as long as the external pair, and of a pure white colour; the internal and external pairs white, ringed with black. The feet are very prominent, strong, rounded, conical, and armed with seven or eight stout brown bristles. The second branch is extremely small, and sends off two or three very small white setæ. The superior cirrus is tolerably long and sharp-pointed; it is pedunculated, the peduncle being stout, conical, and of a deep black colour. The inferior cirrus is short, conical, and sharp-pointed. The last segment of the body is terminated by two tolerably stout, but not long, cirri.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

2. Lepidonotus lordi, Baird.

This species is about 3 inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about $\frac{2}{16}$ths of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. On the under surface, a groove runs down the centre of the body throughout its whole length. The elytra are thirty-five pairs in number, thin, membranous, and of a light-brown colour. The two first overlap each other slightly in the middle; but, for the rest of its length, the centre of the back is uncovered. The antennæ are five in number, the central one short, of much the same length as the internal ones; the two external the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp, but curved, pointed bristles. The superior cirri are white and of a moderate length; the inferior ones very short.

A good many specimens of this species were taken, and they were all found nestling under the shell, and occasionally coiling themselves under the foot, of the animal of *Fissurella cratitia*.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

3. Lepidonotus grubei, Baird.

This species is about 2 inches long, and $\frac{1}{2}$ an inch broad. The body underneath is of a uniform brown colour; above it is whitish, mottled with black. The elytra are eighteen pairs in number, nearly round, rough, with small tubercles, edged by a slightly raised margin,

and mottled with black and white. They do not meet each other in the centre, but leave a portion of the back uncovered. The superior cirri are rather long, blunt-pointed, pedunculated, marked with a black spot at the base, where they issue from the peduncle, and are ringed with black a little distance from the extremity. The inferior cirri are short and acute-pointed. The feet are broad, and the bristles of both branches are stout, of a bright brown colour, and toothed on one edge near the extremity. The antennæ are five in number, and are all short and nearly of equal length.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

4. Lepidonotus fragilis, Baird.

This species, owing to its brittle character, is in too bad a state to describe accurately. It is about 2½ or 3 inches long, and is rather narrow. The scales or elytra appear to be very thin and membranous; but as they are deciduous, it is difficult to ascertain the number, especially as the worm is broken into several pieces. The superior cirri are stout and club-shaped at the tip. There appear to be no ventral cirri on the feet, and the superior cirri become nearly obsolete on the lower half of the body.

It was found by Mr. Lord adhering to a starfish; "but," he says, "it is next to impossible to obtain one perfect, as they break themselves to pieces on the slightest touch, or however carefully killed." In this respect it resembles a species of Annelide belonging to the group of vermiform Aphrodisians, described by Risso as occurring in the Mediterranean, under the name of *Eumolpe fragilis*.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

5. Nereis foliata, Baird.

This Nereid is of a dark grey colour above, and of a lighter hue underneath, somewhat iridescent. It is 15 inches in length, and at the broadest part is about ½ an inch in breadth. It tapers gradually towards the tail, which terminates in two short, blunt, caudal styles. The first or occipital segment of the body is about twice the length of the second. The tentacular cirri are unequal, and vary in length: in the largest and best-developed specimen the longest are only about as long as the first two segments; while in another specimen, nearly of the same size, they are nearly equal in length to the first four segments, and in one or two small specimens, not a third the length of the two just mentioned, these cirri are equal in length to at least eleven of the first segments of the body. The shorter ones are only about half the length of the first segment of the body. The feet are well developed, the superior branchial appendages are large and in the form of a leaf, giving the animal at first sight the appearance of a species of *Phyllodon*. The antennæ are shorter than the palpi, which are strong and conical in shape.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

This species approaches very nearly to *Nereis virens* of Sars, from Newfoundland (*vide* Middendorf, Sibirische Reise, Annulos. 6, tab. i. figs. 2–6).

6. Nereis bicanaliculata, Baird.

This is rather a small species, about 2 inches long, and $2\frac{1}{2}$ lines in breadth. It is of a dull white colour, and is remarkable for having a channel running down both the dorsal and ventral sides. The channel on the dorsal surface is rather deep, commencing from the eleventh ring, and continues to the tail; the channel itself is quite smooth, the divisions or rings of the body not showing on its surface. On the ventral surface the channel shows marks of the divisions or rings into which the body is divided. The head is small, the antennæ about equal in length to the palpi, and the tentacular cirrhi are equal to about five or six rings of the body. The upper portion of the body is rounded, and not channeled; and the tail terminates in a round, blunt knob, without caudal filaments. The feet are rather small, but are rendered unusually distinct from the peculiar manner in which the rings or divisions of the body are interrupted by the channel running along the centre of the body. It tapers very gradually, and almost imperceptibly for some time, from the head to the tail.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

7. Glycera corrugata, Baird.

This Annelide is about 4 inches in length, exclusive of the proboscis, which, when exserted, is $\frac{3}{4}$ths of an inch long, and is about 3 lines in breadth; the proboscis is 4 lines at its greatest diameter. The head is rather short and conical, and strongly ringed. The antennæ are somewhat broad. The feet are broad, composed of two lobes, and are destitute of branchial filaments. The bristles are jointed, and the setæ straight and sharp. The segments of the body are very numerous, composed of a double ring, the one on which the feet are set being the narrower of the two and raised; while the whole surface of the body, especially on the upper side, is densely, though not very strongly, corrugated throughout its whole length. The proboscis is densely scabrous, and covered with very short dark-coloured bristles. The body tapers to a narrow point posteriorly, and terminates in a loosely connected short lobe, armed at the extremity with a slightly curved, horny, sharp-pointed claw.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

8. Sabellaria saxicava, Baird.

This Worm lives in the rock. The tube in which it lodges is solitary, and is evidently hollowed out of the solid (though not a very hard) rock by itself, and appears to be quite round.

The thoracic portion of the body is round; the abdominal flattened, with an impressed line running down through its whole length. The head is surmounted by an opercular disk composed of two rows of stout, dissimilar bristles (*paleæ*). The inner row consists of about ten stout, cylindrical, sharp-pointed bristles of a dark horn-colour, gradually increasing in size from the dorsal margin towards the ventral. The outer row consists of about eighteen bristles, not so stout, flattened, and finely denticulated on both sides for about half the

length. The postoccipital segment of the body is long, of a dark colour, somewhat wrinkled, and marked with three or four fleshy tubercles, on each side. The thoracic feet are three pairs, and are broad, but short. As only one specimen was found, it was thought unadvisable to dissect the whole worm out; in consequence of which the extremity has not been seen. I am unable to say whether it terminates in a caudal appendage or not.

The length of the exposed portion of the worm is $1\frac{1}{2}$ inch, the breadth about 2 lines. Probably the part enclosed in the tube may be of about equal length.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

3. On the Genera and Species of Fossaridæ found in Japan. By Arthur Adams, F.L.S., etc.

Of all the different forms peculiar to this little group, the animal of *Fossar* only has been examined. It is distinguished from that of *Littorina* and *Trichotropis* by the possession of two frontal interten-tacular lobes. In this respect it resembles that of the Trochidæ; but the sides of the foot and the operculigerous lobe are simple. In the 'Annals' for 1860 I suggested therefore the creation of a family Fossaridæ to include the genera *Fossar* and *Isapis*, to which I added *Conradia* and *Couthouyia*, two new forms from the Sea of Japan. I now add descriptions of *Cithna* and *Gottoina*, also new types from the shores of the same archipelago. The species of *Fossar* which I named *F. japonicus* I find identical with *F. costatus*, Brocc., which inhabits the Mediterranean.

Genus 1. Fossar, Adanson.

1. Fossar costatus, Brocc.

Nerita costata, Brocc. p. 300, t. 11. f. 11.
Delphinula costata, Bron.
Purpura costata, Sow.
Sigaretus costatus, Serres.
Fossarus tornatilis, Gould, Otia, p. 110.
Fossar japonicus, A. Ad. Annals, 1861.
Hab. Seto-Uchi; Kuro-Sima; Tsu-Sima.

2. Fossar trochlearis, A. Ad. Proc. Zool. Soc. 1853, p. 187.

Hab. O-Sima.

3. Fossar fenestratus, A. Ad.

F. *testa neritoidea, solida, alba, anguste umbilicata, spira obtusa, anfractu ultimo permagno, anfractibus cingulis quatuor elevatis transversis et costis longitudinalibus validis late clathratis; apertura semiovata; labio recto; labro margine valde crenato.*

Hab. O-Sima.

A solid Neritoid species, with the spire obtuse, and the whorls very coarsely clathrate.

Subgenus COUTHOUYIA, A. Ad.

1. COUTHOUYIA DECUSSATA, A. Ad. Annals, 1860.

Hab. Mino-Sima.

2. COUTHOUYIA RETICULATA, A. Ad.

Fossar reticulatus, A. Ad. Proc. Zool. Soc. 1853, p. 186.
Hab. Seto-Uchi; Uraga.

3. COUTHOUYIA STRIATULA, A. Ad.

C. *testa ovata, rimata, fusca, spira acuminata; anfractibus* $4\frac{1}{2}$, *convexis, transversim striatis, lineis incrementi obsoletim impressis, suturis profundis, apertura elongato-ovali; labio tenui, arcuato; labro margine integro, rima umbilicali angusta, elongata, semilunari.*
Hab. Yobuko, 25 fathoms.
This is a thin, transversely striated species, with a linear rimal fissure, and with the spire much produced.

4. COUTHOUYIA PLICIFERA, A. Ad.

C. *testa ovata, tenui, rimata, fusca, spira acuminata; anfractibus* $4\frac{1}{2}$, *convexis, transversim tenuiter striatis, longitudinaliter plicatis, plicis obliquis, tenuibus, subdistantibus, suturis canaliculatis, apertura ovata; labio arcuato; labro margine integro; rima umbilicali angusta, lunata.*
Hab. Yobuko.
This is a small species, with plicate whorls and canaliculated suture; it is finely striated transversely, and is very thin, like most shells obtained at any considerable depth.

Genus 2. ISAPIS, H. & A. Adams.

1. ISAPIS LIRATA, A. Ad. Annals, 1860.

Hab. Mino-Sima.

2. ISAPIS CONOIDEA, A. Ad.

I. *testa ovato-conoidea, alba, solida, rimata, spira acuta, elatiuscula; anfractibus quatuor, planatis, transversim valde liratis, liris subdistantibus, æqualibus, interstitiis longitudinaliter concinne clathratis; apertura ovata; labio incrassato, superne dente acuto transverso instructo; labro margine acuto, integro.*
Hab. Takano-Sima, in shell-sand.
The form is conoidal, the tooth is at the upper part of the inner lip, and the outer lip is not crenate. In other respects it somewhat resembles *I. ovoidea*, Gould.

Genus 3. CONRADIA, A. Ad.

1. CONRADIA CINGULIFERA, A. Ad. Annals, 1860.

Hab. Mino-Sima; Uraga.

2. CONRADIA CARINIFERA, A. Ad. Annals, 1860.

Hab. Mino-Sima; Gotto.

3. CONRADIA CLATHRATA, A. Ad. Annals, 1860.

Hab. Mino-Sima.

4. CONRADIA PULCHELLA, A. Ad. Annals, 1861.

Hab. Tsu-Sima, 16 fathoms; Gotto, 48 fathoms.

5. CONRADIA DOLIARIS, A. Ad.

C. *testa turbinata, sordide alba, profunde umbilicata; anfractibus* $4\frac{1}{2}$, *convexiusculis, transversim valde liratis (liris in anfractu ultimo* 7, *æquidistantibus), interstitiis concinne cancellatis, suturis canaliculatis; apertura orbiculari; labio tenui, arcuato; labro margine fimbriato; rima umbilicali angusta, lunata.*

Hab. Seto-Uchi (Mososeki, 7 fathoms).

This is a very pretty species, with distant transverse ridges, and the interstices neatly cancellated. The shell is very thin, the aperture is nearly circular, and the sutures are deeply channeled.

6. CONRADIA TORNATA, A. Ad.

C. *testa turbinata, alba, solida, anguste umbilicata; anfractibus* $3\frac{1}{2}$, *convexis, transversim valde liratis, liris in anfractu ultimo* 5, *distantibus, interstitiis longitudinaliter valde striatis; suturis mediocribus; apertura circulari; labio incrassato, antice subdilatato, arcuato; labro margine fimbriato.*

Hab. Gotto, 48 fathoms.

A small, solid, neatly sculptured species, with a narrow umbilicus, and the interstices between the strong transverse ridges very coarsely striate.

Subgenus GOTTOINA, A. Ad.

Testa turbinoidea seu trochiformis, imperforata; anfractibus transversim liratis. Apertura ovata; labio simplici, arcuato.

This form differs from *Fossar* in the absence of the peculiar deep rimal fissure, and in the inner lip being arcuate instead of straight; from *Conradia* and *Couthouyia* in being solid and imperforate; and from *Isapis* in the inner lip not being furnished with a tooth.

1. GOTTOINA SULCIFERA, A. Ad.

G. *testa depresso-turbinata, albida, solida, rimata, spira obtusa; anfractibus* $3\frac{1}{2}$, *convexis, liris transversis validis æqualibus, interstitiis longitudinaliter concinne striatis, ornatis; apertura ovata; labio subincrassato, arcuato; labro margine crenulato.*

Hab. Gotto, 48 fathoms.

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2. GOTTOINA PYRGULA, A. Ad.

G. *testa trochoidea, albida, solida, imperforata, spira elata; anfractibus* $4\frac{1}{2}$, *subplanatis, liris validis, transversis, subnodulosis, et lineis elevatis, longitudinalibus, late cancellatis, lineis in anfractu ultimo inferne obsoletis; apertura ovata; labio tenui, arcuato; labro margine crenato.*

Hab. Gotto, 48 fathoms.

Subgenus CITHNA, A. Ad.

Testa globoso-turbinata, tenui; anfractibus lævibus. Apertura vix circularis; labio tenui, arcuato; labri margine simplice; umbilico carina semilunari extus instructo.

This form resembles *Conradia*, without any ridges or keels on the whorls. The umbilicus is exactly similar to that of *Omphalotropis*, Pfr.

1. CITHNA GLOBOSA, A. Ad.

C. *testa globoso-turbinata, alba, tenui, profunde umbilicata, lineis incrementi ornata; anfractibus* 4, *convexis, suturis profundis; apertura orbiculari; labio arcuato, acuto; labri margine simplici; umbilico extus valde carinato.*

Hab. Seto-Uchi; Harima Nada.

2. CITHNA SPIRATA, A. Ad.

C. *testa turbinata, tenui, albida, late et profunde umbilicata, spira elata; anfractibus* 4, *planatis, superne angulatis, ultimo ad peripheriam carinula transversa instructo; apertura ovata; labio tenui, arcuato; labro simplici, acuto; umbilico carina conspicua circumcincto.*

Hab. Seto-Uchi; Idsuma Nada.

4. LIST OF THE SPECIES OF PHASIANIDÆ, WITH REMARKS ON THEIR GEOGRAPHICAL DISTRIBUTION. By P. L. SCLATER, M.A., PH.D., F.R.S., SECRETARY TO THE SOCIETY.

(Plate XVI.)

There is little doubt that all the species of the family *Phasianidæ* might be introduced into this country, and bred in our aviaries. Whether, as the more sanguine advocates of acclimatization maintain, it would be possible to add them to our game-preserves, and whether this, if carried out, would be of material advantage to the sportsman, I will not now stop to inquire. It is sufficient to say that increased interest has been lately manifested in many quarters in the acquisition of living examples of these splendid birds, and that I have received numerous offers of assistance from correspondents in various

parts of the world, who are desirous of knowing what Pheasants the Society already possesses, and what would be the most desirable additions that could be made to the present stock in the Gardens. Under these circumstances I have drawn up the subjoined list of all the species of the family *Phasianidæ*, as far as they are known to me, adding some remarks on the general history of the species, and notes on their exact geographical distribution, as far as that can be ascertained.

The family *Phasianidæ* is one of the most typical of the circumscribed order *Gallinæ*, which, according to the arrangement usually followed, is conveniently placed between the *Columbæ*, on the one hand, and the Struthious birds on the other. It consists, according to my ideas, of six natural and tolerably well-defined families, —namely (1) the *Pteroclidæ*, or Sand-Grouse, which may be placed first, as showing certain Columbine affinities*; (2) the *Tetraonidæ*, embracing the true Grouse, Partridges, Odontophores, and Quails; (3) the *Phasianidæ*, containing the Pheasants, Peacocks, Turkeys, and Guinea-fowl; (4) the *Cracidæ*, or Curassows of the New World, to which the genus *Meleagris* leads off, and possibly ought to be referred; (5) the *Megapodidæ*, or Megapodes; and (6) last, the *Tinamidæ*†, or Tinamous, by which the passage is effected to the Struthiones. The geographical distribution of these families is shown by the following table:—

Regio Neotropica.	Regio Nearctica.	Regio Palæarctica.	Regio Æthiopica.	Regio Indica.	Regio Australiana.
.....	.....	Pteroclidæ.	Pteroclidæ.	Pteroclidæ.	.....
Tetraonidæ.	Tetraonidæ.	Tetraonidæ.	Tetraonidæ.	Tetraonidæ.	Tetraonidæ.
.....	Phasianidæ. (Meleagris.)	Phasianidæ.	Phasianidæ. (Numidinæ.)	Phasianidæ.	.....
Cracidæ.	.....				
.....	.....		.....	Megapodidæ.	Megapodidæ.
Tinamidæ.	.....				

By this it will be seen that the true *Phasianidæ* are only represented in the New World by the genus *Meleagris*, and in Africa by three small genera of the *Numidinæ*. It is in the Indian region where these Gallinaceous birds have attained their great development, most of the large and splendid forms of the group being confined to this region, though certain outliers have been thrown out from it into the adjoining parts of the Palæarctic Region.

The *Phasianidæ* may be conveniently divided in the following way:—

* See Mr. Newton's remarks, P. Z. S. 1861, p. 203.

† In spite of what Mr. Parker has stated before this Society, as to the undoubted affinities of the Tinamous (see P. Z. S. 1862, p. 259), I cannot yet make up my mind to arrange this group with the Struthiones, and therefore leave them for the present at the end of the Gallinaceous group.

I. Phasianinæ ... (35 species.)	1. Lophophorus	N. India.
	2. Pucrasia	N. India.
	3. Phasianus ...	Eastern Europe, Central Asia, China, Japan, and N. India.
	4. Thaumalea ..	Central Asia.
	5. Crossoptilon.	Central and Eastern Asia.
	6. Euplocamus .	N. India, Burmese Countries, China, Sumatra, and Borneo.
	7. Gallus	India, Burmese Countries, Sumatra, Java, and islands beyond, up to Timor.
	8. Ceriornis ...	N. India and China.
II. Pavoninæ ... (8 species.)	1. Pavo	India, Burmese Countries, and Java.
	2. Polyplectron	N. India, Burmese Countries, and Sumatra.
	3. Argus.....	Malacca, Sumatra, and Borneo.
III. Meleagrinæ.... (3 species.)	1. Meleagris ...	North-eastern and Central America.
IV. Numidinæ .. (10 species.)	1. Numida.....	Africa.
	2. Phasidus ...	W. Africa.
	3. Agelastus ...	W. Africa.

In the following catalogue of species I have inserted those only which I believe are unquestionably good. There are examples of nearly all of these in the splendid collection of the British Museum*; and I may state that I have seen specimens of all the fifty-six species enumerated below, except *Numida pucherani*. I have to thank Mr. Wallace, Mr. Swinhoe, and Mr. Blyth for communicating to me various particulars concerning the range of the different species.

Subfam. I. PHASIANINÆ.

Range.—Palæarctic and Indian Regions; straggling into the confines of the Australian Region.

Genus 1. Lophophorus.

Range.—Southern slopes of the Himalayas.

1. Lophophorus impeyanus. (Impeyan Pheasant.)

Phasianus impeyanus, Latham, Ind. Orn.

Lophophorus impeyanus, Gould, B. Asia, pt. 2.

Hab. Southern slopes of Himalayas; probably throughout the whole range, but certainly from Simla to Darjeeling. Cashmere, at high elevations; nowhere abundant, but pretty generally distributed (*A. L. Adams*).

Genus 2. Pucrasia.

Range.—Southern slopes of the Himalayas.

1. Pucrasia macrolopha. (Pucras Pheasant.)

Satyra macrolopha, Less. Dict. Sc. N. lix. p. 196.

Pucrasia macrolopha, Gray, Gen. B. iii. p. 563; Gould, B. Asia, pt. 6.

Hab. N.W. Himalayas, common on the ranges near Simla eastward (above 5000 feet elevation, *Dr. A. L. Adams*). Procured by Mr. Hodgson in Nepal.

* The desiderata of the British Museum appear to be only *Euplocamus melanotus*, *E. swinhoii*, *Numida tiarata*, and *N. pucherani*.

2. PUCRASIA CASTANEA. (Western Pucras.)

Pucrasia castanea, Gould, P. Z. S. 1854, p. 99; B. Asia, pt. 6.
Hab. Kafiristan (*Griffith*).

3. PUCRASIA NIPALENSIS. (Nepalese Pucras.)

Pucrasia nipalensis, Gould, P. Z. S. 1854, p. 100; B. Asia, pt. 6.
Hab. Bhotan.

Genus 3. PHASIANUS, Linn.

Range.—Palæarctic Region, from Europe to Japan, and one aberrant species on southern slopes of the Himalayas.

Sect. A. *Phasianus.*

1. PHASIANUS COLCHICUS. (Common Pheasant.)

Phasianus colchicus, Linn.
Hab. Shores of the Caspian, where diffused over Western Asia and Europe.

2. PHASIANUS TORQUATUS. (Chinese Pheasant.)

Phasianus torquatus, Gm. S. N. i. p. 742; Gould, Birds of Asia, pt. 7. pl. 1.
Hab. Eastern Asia, from Transbaikalia, through Amoorland, into Southern China (*Schrenck*, Amur-Reise, i. p. 404).
Very common in the flat cotton-country round Shanghai; and a hill-bird in Southern China, where less common. Believed to have been seen in captivity near Pekin; but not met with there in a wild state (*Swinhoe*).
The Formosan bird varies a little in plumage from Chinese specimens as noted by Mr. Swinhoe (Ibis, 1863, pt. 4).

3. PHASIANUS MONGOLICUS. (Mongolian Pheasant.)

Phasianus mongolicus, Brandt: Gould, B. Asia, pt. 10. pl. 1.
Hab. Altai and Tarbagatai Mountains, and probably the adjoining parts of Mongolia.
Herr v. Schrenck has shown (Amur-Reise, p. 403) that Prof. Brandt was in error in considering this bird as the *P. colchicus*, var. *mongolica*, of Pallas,—Pallas's bird being doubtless the *Phasianus torquatus*, which is the only species met with in Amoorland. The *P. mongolica* of Brandt appears to be a more western species, from the Altai and Tarbagatai Mountains. Mr. Gould speaks of an example killed near Semipalatinsk, which is on the Irtisch, in 80° E. lon. The interposition of this distinct species between the closely allied *P. colchicus* and *P. torquatus* is very singular.

4. PHASIANUS VERSICOLOR. (Japanese Pheasant.)

Phasianus versicolor, Vieill.: Gould, B. Asia, pt. 9. pl. 1; Temm. Pl. Col. 486, 493.
Hab. Japan, Niphon (*Heine*, in Perry's Japan Exp. Zool. ii. p. 224): doubtful if extending into Jesso (*Blakiston*, Ibis, 1862, p. 329).

5. PHASIANUS SŒMMERINGII. (Sœmmering's Pheasant.)

Phasianus sœmmeringii, Temm. Pl. Col. 487.

Hab. Japan, vicinity of Simoda, island of Niphon (*Heine, l. c.*).

Sect. B. *Syrmaticus*, Wagler.

6. PHASIANUS REEVESII. (Barred-tailed Pheasant.)

Phasianus reevesii, J. E. Gray, Ind. Zool. i. pl. 39.
Phasianus veneratus, Temm. Pl. Col. 485.
Phasianus superbus, Jard. Nat. Libr. xiv. p. 202.

Hab. Northern China: vicinity of Pekin (*Lamprey*).

Stated by the Chinese to be found also in the Taihoo district, Central China, on the north side of the Yang-tsze-kiang (*Swinhoe*).

Sect. C. *Catreus*, Cab.

7. PHASIANUS WALLICHII. (Wallich's Pheasant, or The Cheer.)

Phasianus wallichii, Hardw. Linn. Trans. xv. p. .
Phasianus staceii, Gould, Cent. pl. 68.

Hab. North-western Himalayas, lower and intermediate ranges (*Dr. A. L. Adams*).

The Cheer was introduced into Europe by the Society in 1857, along with the three species of Kaleeges, but has not made such good progress—not breeding so freely as the latter birds.

Genus 4. THAUMALEA, Wagl.

Range.—High plateau of interior of Asia.

1. THAUMALEA PICTA. (Golden Pheasant.)

Phasianus pictus, Linn. S. N. i. p. 272.

Hab. Southern Daüria and the eastern part of the Desert of Mongolia, in summer advancing sometimes up to the Amoor (*Pallas*, Zoogr. ii. p. 86; *Schrenck*, Amur-Reise, i. p. 521). Interior of China, provinces of Kansú and Sechuen, whence brought into Canton, living, for sale (*Swinhoe*).

2. THAUMALEA AMHERSTIÆ. (Lady Amherst's Pheasant.)

Phasianus amherstiæ, Leadb. Linn. Trans. xvi. p. 129; Gray & Mitch. Gen. B. pl. 125.

Hab. Probably the Chinese province of Yunnan and adjoining region of Tibet.

The original examples of this splendid bird were "presented by the King of Ava to Sir Archibald Campbell, who gave them to the Countess Amherst. Her ladyship retained them in her possession about two years, and ultimately succeeded in bringing both of them to England alive; but they only survived the voyage a few weeks" (*Leadbeater*, in Linn. Trans. xvi. p. 129).

Mr. Hodgson obtained skins of this bird whilst in Nepal, as noticed by Blyth (Cat. of As. Soc.'s Mus. p. 246), who gives as

locality the "bordering regions of China and Tibet." Other examples obtained by Mr. Hodgson are in the British Museum.

Genus 5. Crossoptilon, Hodgs.

Range.—Tibet, interior of China, and Tartary.

1. Crossoptilon tibetanum. (Tibetan Eared-Pheasant.)

Crossoptilon tibetanum, Hodgs. Journ. As. Soc. Beng. vii. p. 864.
Hab. Eastern Tibet: only one specimen known, obtained by Mr. Hodgson, and now in the British Museum.

2. Crossoptilon auritum. (Pallas's Eared-Pheasant.)

Phasianus auritus, Pallas, Zoogr. R. A. ii. p. 86.
Crossoptilon auritum sive *mantchuricum*, Swinhoe, P. Z. S. 1862, p. 286.
Hab. Mantchuria, north of Pekin: obtained by Dr. Lamprey at Pekin (see P. Z. S. 1862, p. 221).

Genus 6. Euplocamus.

Range.—Southern slopes of the Himalayas, and eastwards through Burmese countries to Southern China and Formosa; Sumatra and Borneo, but not Java.

Sect. A. *Diardigallus.*

1. Euplocamus prælatus. (Siamese Pheasant.)

Diardigallus prælatus, Bp. Compt. Rend. xliii. p. 415 (1856); Gould, B. Asia, pt. xii.
Gallus diardi, Temm. in Mus. Lugd.; Schlegel, Handl. t. d. Dierk. i. p. 379.
Diardigallus fasciolatus, Blyth, J. A. S. B. xxvii. p. 280.
Euplocamus crawfurdi, in Mus. Brit.
Diardigallus crawfurdi, Schomb. P. Z. S. 1862, p. 250.
Hab. Siam; Shan States, to the east of Kieng-Mai (*Schomburgk*).
Mus. Brit.

Sect. B. *Euplocamus.*

2. Euplocamus vieilloti. (Vieillot's Fire-back.)

Gallus ignitus, Vieill. Gal. pl. 207 (♂).
Phasianus ignitus, Raffles, Linn. Trans. xiii. p. 320.
Euplocamus ignitus, J. E. Gray, Ind. Zool. ii. pl. 39 (♀).
Gallophasis vieilloti, G. R. Gray, Gen. B. iii. p. 498; Sclater & Wolf, Zool. Sketches, ser. 2. pt. 1. pl. 6 (ex ave vivâ).

♂. *Niger, purpureo splendens: dorso imo ignescenti-castaneo: lateribus albo notatis: rectricibus quatuor mediis fulvescenti-albis.*

♀. *Brunnea, plumis corporis subtus albo marginatis.*

Hab. Province of Mergui, Tenasserim, and southwards throughout Malayan peninsula, Sumatra.

Easily distinguished from the two following species by its white side-stripes. Specimens of both sexes were obtained at Malacca by Mr. Wallace.

3. EUPLOCAMUS IGNITUS. (Latham's Fire-back.)

Phasianus ignitus, Lath. Ind. Orn. Suppl. p. lxi.
Gallus macartneyi, Temm. Pig. & Gall. iii. p. 663.

♂. *Niger, purpureo splendens : dorso imo igneo-ferrugineo : lateribus pallide castaneis, nigro variis : rectr. 4 mediis albis.*
♀. *Brunnea, subtus plumis albo variegatis.*
Hab. Probably Sumatra.

There are specimens of this bird in the Leyden Museum and in the British Museum ; but in neither case is the exact locality known. Macartney's original specimen was procured at Batavia ; but Mr. Wallace tells me there is certainly no form of this family, except *Gallus* and *Pavo*, in Java. In this species the flanks are pale chestnut, varied with purplish black ; the middle of the belly is black, and the four intermedial rectrices are nearly white, as in *E. vieilloti*.

4. EUPLOCAMUS NOBILIS, n. s. (Bornean Fire-back.) (Pl. XVI.)

Euplocamus ignitus ex Borneo auct.

♂. *Niger, purpureo splendens : dorso postico et lateribus cum ventre toto saturate castaneis : rectricibus quatuor mediis et proximæ utriusque pogonio interno cervinis.*
♀. *Brunnea, subtus albo variegata.*
Hab. Borneo.

There are two specimens of this bird in the British Museum from Borneo ; and in the Leyden collection is an example from the same locality. The species closely resembles the true *E. ignitus*, but is readily distinguished by its fawn-coloured medial rectrices and wholly chestnut belly. One example in Mr. Wallace's collection was obtained at Sarawak.

5. EUPLOCAMUS SWINHOII. (Swinhoe's Pheasant.)

Euplocamus swinhoii, Gould, P. Z. S. 1862, p. 284.

♂. *Niger, metallice purpurascens : crista media et dorso summo niveis : scapularibus badiis : rectricibus duabus intermediis albis, ceteris nigris : alis extus æneis : cera et pedibus rubris.*
♀. *Brunnea, nigro vermiculata : ventre puriore : alis nigris, brunneo fasciatis.*
Hab. Formosa (*Swinhoe*).

Sect. C. *Acomus*, Reichenb.

6. EUPLOCAMUS ERYTHROPHTHALMUS. (Rufous-tailed Pheasant.)

Phasianus erythrophthalmus, Raffl. Trans. Linn. Soc. xiii. p. 321.
Gallophasis erythrophthalmus, Gray, Gen. B. iii. p. 498.
Phasianus purpureus, Gray, Ind. Zool. i. pl. 42 (♀).

♂. *Niger, alis griseo undulatis : dorso imo igneo : cauda fulva : oculorum ambitu nudo rubro.*

♀. *Purpureo niger, unicolor.*

Hab. Sumatra (*Raffles*); common in collections from Malacca.

I am inclined to believe that Raffles is right in his description of the female of this bird—that sex having been considered by some authors as a distinct species, and named in Gray's 'Indian Zoology' *Phasianus purpureus*. A male example of this species was obtained at Malacca by Mr. Wallace.

7. EUPLOCAMUS PYRONOTUS (Bornean Rufous-tailed Pheasant.)

Euplocamus erythrophthalmus, J. E. Gray, Ind. Zool. ii. pl. 39. fig. 1.

Alectrophasis pyronota, G. R. Gray, List of Gallinæ, p. 26.

Euplocamus personatus, Temm. in Mus. Lugdun.

♂. *Niger : dorso imo igneo : cauda fulva : corpore subtus albo longitudinaliter lineato.*

♀. *Purpureo-niger, unicolor.*

Hab. Borneo (*Mus. Brit.*).

Easily distinguished from *E. erythrophthalmus* by the white medial shaft-lines of the plumage below. The female specimen in the British Museum appears very like the female of the preceding species. Two examples, males, one of which was obtained near Sarawak, are in Mr. Wallace's collection. The naked space round the eye is marked red.

Sect. D. *Gennæus*, Wagler.

8. EUPLOCAMUS NYCHTHEMERUS. (Silver Pheasant.)

Phasianus nycthemerus, Linn. S. N. i. p. 272.

Gennæus nycthemerus, Gould, B. Asia, pt. xi.

Nycthemerus argentatus, Sw. Class. ii. p. 34.

Hab. Southern China. "Has been shot in the vicinity of Amoy; inhabits the wooded hills of the interior of Southern China" (*Swinhoe*).

Sect. E. *Gallophasis*.

9. EUPLOCAMUS LINEATUS. (Lineated Pheasant.)

Lineated Pheasant, Latham, G. H. viii. p. 221.

Phasianus lineatus, Vigors, P. Z. S. 1831, p. 24.

Phasianus reynaudi, Lesson, in Belanger's Voy. Zool. pls. 8, 9.

Phasianus fasciatus, M'Clelland, Calcutta Journ. vol. ii. p. 146.

Hab. Tenasserim and Pegu, replacing the following species, *E. horsfieldi*, which is connected with the present by a series of intermediate forms found in Arracan. (See Blyth, Cat. Mus. A. S. B. p. 244.)

N.B. Temminck's *Lophophorus cuvieri* seems to have been established upon one of these intermediate forms. (See Blyth, *l. c.*)

10. EUPLOCAMUS HORSFIELDI. (Horsfield's Kaleege.)

Gallophasis horsfieldi, G. R. Gray, Gen. B. iii. pl. 126.

Hab. Assam and Sylhet.

This and the two following species were introduced by the Society in 1857, and are bred every year in the Gardens. Full details respecting them have been given from time to time in the 'Proceedings' and 'Annual Reports' of the Society. (See P. Z. S. 1858, p. 554, and 1860, p. 444.)

11. EUPLOCAMUS MELANOTUS. (Black-backed Kaleege.)

Euplocamus melanotus, Blyth, J. A. S. B. xvii. p. 694; Cat. Mus. A. S. B. p. 244.

Hab. Sikhim and probably Bhotan.

12. EUPLOCAMUS ALBOCRISTATUS. (White-crested Kaleege.)

Phasianus albocristatus, Vig. P. Z. S. 1832, p. 16; Gould, Cent. pl. 66.

Hab. Western Himalayas: "rare on the Cashmere ranges; more plentiful on those near the Punjab" (*Dr. A. L. Adams*, P. Z. S. 1859, p. 186).

Capt. Thomas Hutton observes with reference to this species, in his 'Notes on the Nidification of Indian Birds' (J. A. S. B. xvii. pt. 2. p. 694):—

"In Mr. Gray's catalogue of the collection presented to the British Museum by Mr. Hodgson, this and *Phasianus hamiltonii* are given as synonyms of *Gallophasis leucomelanos*. In this there appears to be some degree of error, for the species are distinct. Mr. Blyth, *in epistolâ*, writes that 'there are' four true races and two hybrids. Of the former, one is *E. albo-cristatus*, crest rarely very white, the white on the rump always well developed; and found *exclusively* westward of Nepal. *E. melanotus*, Blyth, which has a black crest, and no white on the rump, is common at Darjeeling: and the Nepalese *E. leucomelanos* is certainly a cross between these two. *E. cuvieri* of Assam, Sylhet, &c., has white on the rump, but the under parts wholly shining black; and this has produced a mixed race with *E. lineatus* in Arracan.

"If such be the case, the name of *leucomelanos*, belonging only to a hybrid, and not to a true species, must give place to Gould's name of *albocristatus*. *Phasianus hamiltonii* of Gray's 'Ill. Ind. Zool.' looks very like an immature male of the present species, but, being from Nipal, is probably an immature hybrid. In the neighbourhood of Mussooree and Simla we have only *Euplocamus* (*Gallophasis*) *albocristatus* (*verus*),—the others all occurring more to the eastward, as correctly observed by Mr. Blyth. The long white crest is seldom, or perhaps never, found except in fully mature birds, it being generally of a dirty or dusky hue, like that figured in Gould's 'Century.' Every place, however, is now so thoroughly poached over by native shikarrees that an old white-crested bird is extremely rare."

Genus 7. Gallus.

Range.—India, Ceylon, and throughout Burmese countries into Sumatra, Java, and islands beyond, as far as Timor: Philippines(?).

1. Gallus bankiva. (Bankiva Jungle-fowl.)

Gallus bankiva, Temm. H. N. Pig. & Gall. ii. p. 87.
Gallus ferrugineus, Blyth, Cat. p. 242.
Hab. Java, Sumatra, Malacca, Burmese countries: Assam; and jungly districts of all Northern India, from valleys of the Subhimalayan region southward to the Vindhya range and N. Circars (*Blyth*). Philippines (*Crawford*). All the islands between Java and Timor inclusive, and also Southern Celebes (*Wallace*).

2. Gallus stanleyii. (Ceylonese Jungle-fowl.)

Gallus lafayettii, Less.
Gallus stanleyii, J. E. Gray, Ind. Zool.
Hab. Ceylon.

3. Gallus sonneratii. (Sonnerat's Jungle-fowl.)

Gallus sonneratii, Temm. Pl. Col. 232, 233.
Hab. Peninsula of India.
"Tolerably abundant in most of the lofty jungles of Southern India; also found in the lower jungles in the Carnatic and eastern range of Ghauts" (*Jerdon*). Very rare and local in the Vindhya range, and not found further north of it. Royle is wrong in stating that it is found in the North-western Himalayas (*Blyth*).

4. Gallus varius. (Fork-tailed Jungle-fowl.)

Phasianus varius, Shaw, Nat. Misc. pl. 9.
Gallus javanicus, Horsf. Linn. Trans. xiii. p. 185.
Gallus furcatus, Temm. Pl. Col. 433.
Hab. Java: Lombock, Sumbawa, and Flores.
Mr. Wallace has examples of this bird from Java and Flores which show little variation. He saw it in Lombock, and heard of its being more abundant in Sumbawa.

Genus 8. Ceriornis.

Range.—Southern slopes of Himalayas into Southern China.

1. Ceriornis satyra. (Horned Tragopan.)

Meleagris satyra, Linn. S. N. i. p. 269.
Tragopan satyrus, Gould, Cent. pl. 62.
Ceriornis satyra, Blyth, Cat. p. 240.
Hab. South-eastern Himalayas, Nepal, Sikim: Bhotan.

2. Ceriornis melanocephala. (Black-headed Tragopan.)

Satyra melanocephala, Gray in Griff. An. K. iii. p. 29.
Tragopon hartingsi, Vig. P. Z. S. 1832, p. 8; Gould, Cent. pls. 63, 64, 65.

Ceriornis melanocephala, Gray, Gen. B. iii. p. 499; Gould, B. Asia, pt. 7. pl. 9.

Hab. Slopes of North-western Himalayas: higher ranges north-west of Simla, and Southern Pinjal forests of Cashmere (*Dr. A. L. Adams*).

3. CERIORNIS TEMMINCKII. (Temminck's Tragopan.)

Satyra temminckii, J. E. Gray, Ill. Ind. Zool. i. pl. 50.

Hab. China: exact locality unknown.

Obtained by Mr. Reeves from Beale's Menagerie, and brought alive to this country.

4. CERIORNIS CABOTI. (Cabot's Tragopan.)

Ceriornis caboti, Gould, P. Z. S. 1857, p. 171; B. Asia, pt.

Hab. China (?).

Described from a single specimen in Dr. Cabot's collection, said to have been obtained at Macao.

Subfam. II. PAVONINÆ.

Range.—Indian region except China, Java, and Philippines.

Genus 1. PAVO, Linn.

Distribution.—Peninsula of India, Burmese countries, and Java.

1. PAVO CRISTATUS. (Common Pea-fowl.)

Pavo cristatus, Linn. S. N. i. p. 267.

Hab. Indian peninsula, Himalayas (up to 4000 feet), and Ceylon; jungles among the salt-range of the Punjâb (*Dr. A. L. Adams*).

At one time I supposed that the Ceylonese species of Peacock might be the next (*Pavo nigripennis*); but Sir J. Emerson Tennant having kindly procured me a skin from Ceylon for comparison, I find it to be the same as the Indian *Pavo cristatus*.

2. PAVO NIGRIPENNIS. (Black-winged Pea-fowl.)

Pavo nigripennis, Sclater, P. Z. S. 1859, p. 221.

I am still at a loss to know what was the original sedes of this Peacock, which I cannot regard otherwise than as a very distinct species. Raffles (Linn. Trans. xiii. p. 319) says the "Common Peacock is a native of the Malay peninsula and Java;" and in the Appendix to his Memoir, *Pavo cristatus* is given as being found in Sumatra. Can the present bird be the Malayan form of the common species?

3. PAVO MUTICUS. (Javan Pea-fowl.)

Pavo javanicus, Horsf. Linn. Trans. xiii. p. 185.

Hab. Burmese and Malay countries, ranging northwards to Arracan; Java (*Horsf.*); Sumatra (*Vigors* in Raffles's Mem. p.676).

Obtained in Eastern Java by Mr. Wallace, and said to be abundant all over the island.

Genus 2. POLYPLECTRON, Temm.

Range.—From Assam, throughout Burmese countries, to Sumatra and Borneo (?).

1. POLYPLECTRON CHINQUIS. (Indian Polyplectron.)

Polyplectron chinquis, Temm. Pl. Col. 539.

Hab. Assam, Sylhet, Arakan and Tenasserim, down to Mergui.

This is the *Pavo tibetanus* of Linnæus, but, not being found in Tibet, cannot be called by that specific name. The best figure of the male bird is given in the 'Planches Coloriées.' We received two males of this species in 1857, presented to us by the Babu Rajendra Mullick, which are still living in good health in the Gardens. The same gentleman has again sent us a pair this year, but the female unfortunately died before reaching England. There is, however, no doubt that this fine bird would do well in captivity.

2. POLYPLECTRON BICALCARATUM. (Hardwicke's Polyplectron.)

Pavo bicalcaratus, Linn.
Polyplectron iris, Temm.
Polyplectron hardwickii, Gray, Ind. Zool. i. pl. 37.
Hab. Malacca, commonly received in collections of skins formed in Malacca; Sumatra (*Raffles*).

3. POLYPLECTRON CHALCURUM. (Sumatran Polyplectron.)

Polyplectron chalcurum, Temm. Pl. Col. 519.
Hab. Sumatra.
Mus. Brit.

4. POLYPLECTRON EMPHANES. (Napoleon's Polyplectron.)

Polyplectron napoleonis, Less. Trait. d'Orn. p. 487 (*desc. nulla*).
Polyplectron emphanum, Temm. Pl. Col. 540.
Hab. Perhaps Borneo.
Mus. Brit.

Genus 3. ARGUS, Temm.

Range.—Malay peninsula, Sumatra, and Borneo.

1. ARGUS GIGANTEUS. (Argus Pheasant.)

Phasianus argus, Linn.
Argus giganteus, Temm.; Vieill. Gal. pl. 203.
Hab. Malacca, and northwards to Mergui (*Blyth*); Siam (*Mouhot*); Sumatra in the deep forests, generally in pairs (*Raffles*); North-western Borneo (*Wallace*).

The Siamese and Bornean birds may probably constitute local varieties.

A second species of *Argus* (*Argus ocellatus*) has been created on the faith of certain feathers in the French National Collection, but the bird is otherwise unknown. See Bp. Compt. Rend. xlii. p. 878.

Subfam. III. MELEAGRINÆ.

Range.—America, north of Panama and east of Rocky Mountains to Canada.

Genus 1. MELEAGRIS.

1. MELEAGRIS GALLOPAVO. (Wild Turkey.)

Meleagris gallopavo, Linn. S. N. i. p. 268; Baird, B. N. Am. p. 615.
Hab. Eastern States of North America.
Mus. Brit.

2. MELEAGRIS MEXICANA. (Mexican Turkey.)

Meleagris mexicana, Gould, P. Z. S. 1856, p. 61; Baird, *l. c.* p. 616.
Hab. Table-land of Mexico.

3. MELEAGRIS OCELLATA. (Ocellated Turkey.)

Meleagris ocellata, Temm. Pl. Col. 112.
Hab. Guatemala, province of Peten, and Yucatan.

Subfam. IV. NUMIDINÆ.

Range.—Africa, inclusive of Madagascar.

Genus 1. NUMIDA.

Sect. A. *Numida.*

1. NUMIDA MELEAGRIS. (West African Guinea-fowl.)

Numida meleagris, Linn. S. N. i. 273; Hartl. Orn. W. Afr. p. 199.
Numida rendalli, Ogilby, P. Z. S. 1835, p. 153.
Numida maculipennis, Sw. B. W. Afr. ii. 226.
Hab. Western Africa, from the Gambia southwards through Ashantee to the Gaboon (*Hartl.*); Cape de Verd Islands (*Bolle*).

2. NUMIDA PTILORHYNCHA. (Abyssinian Guinea-fowl.)

Numida ptilorhyncha, Licht.: Rüpp. Syst. Verz. p. 105, pl. 39.
Hab. E. Africa, Abyssinia, Kordofan, and Sennaar (Rüpp.).

3. NUMIDA MITRATA. (Mitred Guinea-fowl.)

Numida mitrata, Pallas, Spic. iv. p. 18.
Hab. South Africa, and northwards along the east coast to the country opposite to Zanzibar, where a specimen was obtained by Capt. Speke (see P. Z. S. 1862, p. 12).

4. NUMIDA TIARATA. (Tiara'd Guinea-fowl.)

Numida tiarata, Bp.: Hartl. Orn. Madagasc. p. 68.
Hab. Madagascar.

Sect. B. *Guttera.*

5. NUMIDA CRISTATA. (Crested Guinea-fowl.)

Numida cristata, Pall. Spic. Zool. iv. p. 15; Hartl. Orn. W. Afr. p. 200; Lath. G. H. viii. pl. 122.
Hab. West Africa: Sierra Leone, Ashantee, and Aguapim (*Hartl.*).

6. NUMIDA PUCHERANII. (Pucheran's Guinea-fowl.)

Numida pucheranii, Hartl. Cab. Journ. f. Orn. 1860, p. 341.
Hab. Zanzibar.
The eastern form of *N. cristata*, and probably the bird taken by Layard for that species, in 'Ibis,' 1861, p. 120.

7. NUMIDA PLUMIFERA. (Plumed Guinea-fowl.)

Numida plumifera, Cassin, Pr. Ac. Sc. Phil. 1857, p. 321, et Journ. iv. p. 6, pl. 2.
Hab. Cape Lopez, Western Africa (*Du Chaillu*).
Mus. Brit.

Sect. C. *Acryllium.*

8. NUMIDA VULTURINA. (Vulturine Guinea-fowl.)

Numida vulturina, Hardw. P. Z. S. 1834, p. 12; Gould, Icon. Av. pl. 8.
Hab. Madagascar (*Layard*, Ibis, 1861, p. 120).

Genus 2. PHASIDUS, Cassin.

Range.—Western Africa.

1. PHASIDUS NIGER. (Black Phasid.)

Phasidus niger, Cassin, Pr. Ac. Sc. Phil. 1851, p. 322, et Journ. iv. p. 7, pl. 3.
Hab. Cape Lopez, W. Africa (*Du Chaillu*).

Genus 3. AGELASTUS, Temm.

Range.—Western Africa.

1. AGELASTUS MELEAGRIDES. (The Agelastes.)

Agelastes meleagrides, Temm. in Mus. Lugd.; Bp. P. Z. S. 1849, p. 145; Hartl. Orn. W. Afr. p. 200.
Hab. West Africa: Dabocrom (*Pel.*); Gaboon (*Verreaux*).
Mus. Brit.

Having enumerated the fifty-six species of the family which I am acquainted with as existing in a state of nature, I may now remark that twenty-five of them have been already possessed by the Society in a living state, namely:—

1. *Lophophorus impeyanus.*
2. Pucrasia macrolopha.
3. *Phasianus colchicus.*
4. *Phasianus torquatus.*
5. —— *versicolor.*
6. —— reevesii.

7. Phasianus wallichii.
8. *Thaumalea picta.*
9. *Euplocamus vieilloti.*
10. —— erythrophthalmus.
11. —— *nychthemerus.*
12. —— lineatus.
13. —— *horsfieldi.*
14. —— *melanotus.*
15. —— *albocristatus.*
16. Gallus bankiva.
17. *Gallus sonneratii.*
18. —— furcatus.
19. *Ceriornis satyra.*
20. —— melanocephala.
21. *Pavo cristatus.*
22. —— *nigripennis.*
23. —— *muticus.*
24. *Polyplectron chinquis.*
25. Argus giganteus.

N.B. Of the species printed in *italics* we have examples now alive in the Gardens.

5. On an Illustration of the Manner in which Birds may occasionally aid in the Dispersion of Seeds. By Alfred Newton, M.A., F.Z.S.

Last summer, my friend Mr. Henry Stevenson, the Secretary of the Norfolk and Norwich Museum, showed me the singular specimen which, by his liberality, I now exhibit. It will be seen that it is



the leg and mutilated foot of a French Partridge (*Caccabis rufa*, G. R. Gray), a great part of which is imbedded in a mass of clay.

At my request he has since furnished me with the following particulars respecting it :—

"On the 8th of December 1860, Mr. Sayer, a bird-stuffer at Norwich, showed me the Partridge's leg and ball of earth which I recently placed in your hands, and, in answer to my inquiries, gave me the following particulars:—'A gentleman, whose name he did not know, but whose face was quite familiar to him as an occasional visitor to his shop, brought the leg to him a day or two before, stating that the bird to which it belonged had been seen, on a heavy-land farm in Suffolk, hobbling along in a very unusual manner, and was with little difficulty run down and secured. It was then found that the lower half of one leg was imbedded in a mass of earth, which raised it considerably from the ground, and necessarily kept the limb in a bent position. The bird was half starved.'

"The lump, measuring $7\frac{1}{2}$ inches in circumference, and weighing $6\frac{3}{4}$ oz., had become as hard as stone, and certainly in that state accounted for the bird not having been able to free itself from the encumbrance. Two toes only are visible, of which one has the nail torn off level with the edge of the mass itself. From the upper part protrudes a short bit of straw, and this being entangled round the foot probably by degrees collected the soil, which may also have been hardened by the frost at night. The unfortunate bird may, too, have been wounded in the leg, and thus unable to endure the pain of removing the earth when it first began to accumulate. I have no reason to doubt Mr. Sayer's statement, and believe he told me what he heard from the gentleman. The leg, when I saw it, looked fresh where it had been cut off.

(Signed) "HENRY STEVENSON."

It will be remembered that Mr. Darwin, in his work on the 'Origin of Species,' speaks of the possibility of the seeds of plants being occasionally transported to great distances by being enclosed in earth adhering to the beaks and feet of birds; and he mentions the fact of his having "removed twenty-two grains of dry argillaceous earth from one foot of a Partridge," in which earth "there was a pebble quite as large as the seed of a vetch" (pp. 362, 363). Now the mass of clay I exhibit is enormously greater than the quantity of earth mentioned by Mr. Darwin, and is sufficient to hold the germs of a very extensive flora.

Apart from the statement of Mr. Stevenson, that the lump, when he first saw it, was "as hard as stone," and the contrast thereby afforded by the "fresh look" of the leg, a close examination of the specimen convinces me that the clay, as that gentleman suggests, accumulated gradually. The two toes which are visible have become distorted, and have accommodated themselves as well as they were able to the shape of the mass. I imagine also that the loss of the claw, noticed by Mr. Stevenson, has been experienced since the mass attained nearly its present size and shape; and it will be seen that the stump has perfectly healed over. Now all this must have taken some time; I do not venture to say whether days, weeks, or months. It is clear that, as the bulk and weight of the encumbrance increased,



Wolf ad nat. lith.

M. & N. Hanhart imp.

PROBIMIA XANTHOMYSTAX

BRITISH
3 AU 64
MUSEUM



J. Wolf del. et lith.

M & N Hanhart imp.

PROSIMIA MELANOCEPHALA.

BRITISH
3 AU 64
MUSEUM



Mintern, et Lith. J.&N. Hanhart Imp.

TUPAIA PALLIDA

BRITISH
3 AU 64
MUSEUM

it would more and more interfere with the bearer's means of obtaining a livelihood; and hence, weakened by starvation, the bird was finally unable to rise, and met its death in the manner stated.

If, as I believe, the clay accumulated by degrees, it is obvious that there was once a time when the incipient mass was no heavier a burthen than the bird was able to bear in flight. What the actual limit was, is a question we have no means of determining; at least I am not aware of any experiments having been made tending to show what weight a Partridge is capable of supporting on the wing. But I trust I have said enough to justify me in bringing this before the Society as a singular illustration of the manner in which birds may occasionally aid in the dispersion of seeds.

6. Revision of the Species of Lemuroid Animals, with the Description of some New Species. By Dr. J. E. Gray, F.R.S., etc.

(Plates XVII., XVIII., XIX.)

Having to examine some recently acquired specimens of Lemuroid animals from Western Africa, I was induced to re-examine the series of specimens of the family in the British Museum, and determine the different specimens of the genus which had been received within the last few years, and only named as they were entered in the list of accessions.

There has been published lately two monographs of the family, derived from the same collection, that in the Jardin des Plantes at Paris—the one by Isidore Geoffroy St. Hilaire and MM. Florent Prevost and Pucheran ('Catalogue Méthodique des Mammifères,' Paris, 1851), the other by a young Swedish naturalist, viz. A. G. Dahlbom ('Studia Zoologica,' Lund. 1856). And Dr. Peters, in his work on the 'Zoology of Mozambique,' has examined and described some specimens in the Berlin Museum. So that we may consider that the specimens in the best Continental museums have been carefully examined.

Every one must be struck with the number of genera into which the smaller species of the family are divided; while the larger species are all included in a single genus, divided into sections, which are more decided and more neatly characterized than several of the genera above referred to. This must be sufficiently evident when we find that the most striking and important—indeed I may say the only characters that M. Isidore Geoffroy can find to distinguish allied genera are as follows:—Hind legs, ears, and eyes very developed, *Microcebus*; hind legs, ears, and eyes extremely developed, *Galago*: to which, to be sure, he adds, the first is from Madagascar, and the second from continental Africa and the small islands adjacent to that continent.

In my outline of an attempt at the disposition of Mammalia into tribes and families, in the 'Annals of Philosophy' for 1825 (vol. x. p. 337), I divided the family *Lemuridæ* as under—

† Head long, grinders blunt. 1. *Lemurina*: Lemur, *Lin.* 2. *Lichanotina*: Indris, *Lacép*; Lichanotus, *Illiger*.

†† Head round. 3. *Loridina*: Loris, *Geoff.*; Nycticebus, *Geoff.* 4. *Galagonina*: Otolicnus, *Illiger*; Galago, *Adanson*; Cheirogaleus, *Geoff.* 5. *Tarsina*: Tarsius. 6. *Cheiromyina*: Cheiromys, *Cuvier*,—

considering *Galeopithecidæ* as a separate family.

M. Isidore Geoffroy, in the 'Catalogue of the Mammalia in the Paris Museum,' 1851, divides the Lemuroid animals into three families, viz. *Lemuridæ*, *Tarsidæ*, and *Cheiromyidæ*; and he divides the *Lemuridæ* into three subfamilies, according to the number of the teeth, thus—

I. *Indrisina*.—Grinders $\frac{5-5}{5-5}$; lower cutting teeth 2; in all 30. Genera *Indris*, *Propithecus*, and *Avahis*.

II. *Lemurina*.—Grinders $\frac{6-6}{6-6}$; lower cutting teeth 4; in all 36. Tarsus moderate, or of the usual length. Genera *Lemur*, *Hapalemur*, *Lepilemur*, *Cheirogaleus*, *Perodicticus*, *Nycticebus*, and *Loris*.

III. *Galagina*.—Grinders $\frac{6-6}{6-6}$; lower cutting teeth 4; in all 36. Tarsus elongate. Genera *Microcebus* and *Galago*.

The genus *Galeopithecus* is not included in the part of the work that has as yet appeared.

Mr. A. G. Dahlbom, in his 'Studies on the Primates in the Paris and other Museums,' proposes to divide the Lemurine Primates, or *Prosimiæ*, into three groups, according to the length and breadth of the feet, as defined by the comparative length of the tarsus and metatarsus, thus—

I. The *Prosimiæ brachytarsæ*, with tarsi shorter than the metatarsi. Genera *Indris*, *Avahis*, and *Propithecus*.

II. The *Prosimiæ isotarsæ*, with the tarsi and metatarsi equal in length. Genera *Perodicticus*, *Nycticebus*, *Loris*, *Lemur*, *Lepilemur*, *Cheirogaleus*.

III. The *Prosimiæ macrotarsæ*, with the tarsi much longer than the metatarsus. Genera *Galago*, *Hemigalago*, *Microcebus*, and *Tarsius*.

He regards the *Prosimiæ brachy-* and *iso-tarsæ* as forming the tenth family, *Lemuridæ*; the *Prosimiæ macrotarsæ* as a distinct or eleventh family; and forms the genus *Daubentonia*, Geoffroy (or *Cheiromys* of Cuvier), into a twelfth family, which he calls *Glirisimiæ*.

It will be seen by the foregoing observations that M. Isidore Geoffroy divides the group of Lemuroid animals into three families, according to the form and number of the cutting teeth—thus, *Lemuridæ*, *Tarsidæ*, and *Cheiromyidæ*. I think that such a division is both natural and convenient; and at the same time every one who well examines the osteological characters and the general habit, as well as the external appearance, of the two genera *Tarsius* and

Daubentonia, will come to the conclusion that in the zoological series the Aye-Aye (*Daubentonia*) is properly placed with the Lemuroid Mammalia, and that the genus *Tarsius*, by the disposition and the form of the teeth and by the length of the fingers, forms the link which explains the peculiarities of this otherwise apparently anomalous animal.

Fam. I. Lemuridæ.

Cutting teeth $\frac{2-2}{6}$ or $\frac{1-1}{4}$; the upper far apart; the lower compressed, shelving forward, the two outer larger, opposed to the space between the upper cutting teeth. The fingers and toes free, well developed; the first hind toe shorter, with an elongate curved claw.

Believing that the form of the head and size of the eyes, which indicate the extent of the nocturnal habits of the animal, are of more importance than the mere length and slenderness of the foot, I have proposed the following arrangement of the genera.

I observe that the length of the ears varies considerably in what are in other respects very nearly allied species, and that the ears are very often distorted in the stuffed specimens—so much so that a species may sometimes be said to have a long ear, while if observed alive it would be regarded as only having a moderately developed one; for the ears are often unduly stretched by the stuffer, and the form entirely destroyed; and in some cases they are as much shrunk by not being attended to when the skin is dried. This is important, as sometimes the species, or even a genus, has been described from a living specimen or from an animal preserved in spirits, and at others from a more or less well preserved or stuffed skin; and it is this difference of state that renders the recognition of the animal so difficult, and has caused so many synonyma. For these reasons I have united together into one group some of the genera of the smaller species which have been separated on slight differences in the apparent development and size of the ears.

I propose to arrange the genera as follows:—

I. *The head elongate; face developed; eyes moderate; hind legs elongate; fingers well developed, normal.*

* *Teeth* 30; *hind foot very short; great toe long.* Indrinina.

1. Indris. Tail none.

2. Propithecus. Tail elongate.

** *Teeth* 36; *tail elongate; great toe broad.* Lemurina.

a. *Feet short; ears moderate.*

3. Varecia. The head surrounded by a ruff; ears tufted.

4. Lemur. Head without any ruff; wrist with a narrow bald line and pad above.

5. Prosimia. Head without any ruff; ears externally hairy; wrist hairy.

b. *Feet elongate; ears large.*

6. OTOGALE.

II. *Head short; face short, tapering; eyes (and orbits) very large.*

* *Hind legs elongate; tail elongate.*

† *Teeth* 30; *feet short, broad.* Microrhynchina.

7. MICRORHYNCHUS.

†† *Teeth* 36; *feet short, broad.* Galagonina.

8. HAPALEMUR. Ears moderate; upper cutting teeth on the inside of canine.

9. CHEIROGALEUS. Ears moderate; upper cutting teeth in an arched series.

10. LEPILEMUR. Ears large, elongate; upper cutting teeth in an arched series. Tail with close-set short hair.

11. CALLOTUS. Ears very large, contractile. Tail with bushy hairs.

††† *Teeth* 36; *feet elongate, slender.*

12. GALAGO.

** *Fore and hind feet equal; tail none; feet short.*

† *The hands normal; fingers free, index cloved.* Lorisina.

13. NYCTICEBUS. Limbs short.

14. LORIS. Limbs elongate, slender.

†† *Hands broad, short; index finger abortive, clawless.* Perodicticina.

15. PERODICTICUS.

I. *The head elongate; face well developed; the eyes moderate; the hind legs much longer than the arms; the fingers well developed, free, elongate, normal.*

The form of the head is best seen in the skull, which in this section is elongate; the face is well developed, rather compressed; and the orbits, though large, are much smaller than in the succeeding sections. The length of the head and the size of the orbits vary in the different species, and the division between this and the following tribe is not very strongly marked.

* *Grinders* $\frac{5-5}{5-5}$; *cutting teeth* $\frac{2}{4}$; *in all* 30. *The hind foot short, broad; great toe very long, slender.* Indrinina.

1. INDRIS, Geoff. 1796.

Lichanotus, Illig. 1811.
Pithelemur, Lesson, 1840.

Upper cutting teeth large, strong, compressed, one before the other in an arched line. Ears exserted, hairy. Nostril separated by a very narrow septum. Body thick. Feet short; tarsus shorter than the metatarsus. Tail rudimentary, very short. The great toe very long, slender, and covered with hair.

INDRIS BREVICAUDATUS, Geoff.

Lemur indri, Gmelin.
Indris niger, Vinson.
Var. white, called *Simpoune*.
Indris albus, Vinson, Compt. Rend. lv. 829.
Hab. Madagascar (*Brit. Mus.*).

The claws, like most of the *Lemuridæ*, when perfect are keeled and end in an acute tip.

Skull: length 3″ 10‴, breadth 2″ 3‴,—that is to say, measured in inches and twelfths of an inch or lines.

The four lower cutting teeth of the *Indris* occupy about the same space as the six in the other genera, the central ones being broader, while in the other genera the two central pair are very much compressed and slender; and the upper cutting teeth are stronger and broader; indeed the general character of the skull is to be stronger, though the teeth are fewer. In other respects there is very little difference in the dentition.

2. PROPITHECUS, Bennett.

Macromerus, A. Smith, 1834.
Habrocebus, Wagner, 1840.

Ears short, smooth inside, and visible in the fur. Nostrils separated by a moderate septum. Tail elongate. The two middle upper cutting teeth very large, oblique, sharp-edged. Great toe long, hairy.

PROPITHECUS DIADEMA, Bennett, P. Z. S. 1832, p. 20.
Hab. Madagascar (*Brit. Mus.*).

** *Grinders* $\frac{6-6}{6-6}$; *cutting teeth* $\frac{2-2}{6}$; *the tail elongate, hairy; the great toe short, broad.* Lemurina.

a. *The feet short; ears hairy externally, moderate or hidden; the upper cutting teeth subequal, on the side of the more or less prominent intermaxillary bone.*

The length of the feet are shown in the skeleton by the tarsal bones being shorter, or not longer, than the metatarsal ones; they are shorter than the shank or tibia, being generally about two-thirds the length of that part of the leg.

M. Isidore Geoffroy observes, the species of Lemurs "are numerous; many are very difficult to distinguish, or even doubtful."

It is to be observed that I have never seen the skin of a specimen that was caught wild in its natural habitat. All the specimens that have come under my observation have been living in menageries; and all the skins in the Museum are obtained from specimens which have

been so confined; and some of them have been even born in confinement, and are probably the hybrid offspring of two species, arising from the intermixture of different kinds in the same cages. Under such circumstances, it is very natural that there should be difficulties in separating them, and that there may be intermediate forms. Yet I may state that, when the specimens which have come under my examination have been carefully compared, I have had no difficulty in distinguishing them, and I have not found a single specimen which I have had the slightest reason to believe is a passage from one species to the other. And this is extraordinary when we consider the very imperfect material that is at our command for the determination of the species of this natural genus. In fact it appears to me, after my long experience, that whenever there is any doubt about the distinction of species, it always arises rather from the imperfection of the material at our command, and the consequent imperfection of our knowledge, than from any want of permanence in the species themselves. It is this that makes me doubt the wisdom of the theorists who would explain the order of the creation by the mutability of species, and take advantage of the imperfection of our knowledge as the basis of their theory, instead of placing their faith in practical naturalists, who have studied species in detail for years, and who are all, as far as I know, ready to declare that species (the history and detail of which are well known) are the most certain and best defined groups in nature, and are distinctly circumscribed, while genera, tribes, families, orders, and even classes are constantly gradually passing into each other, or contain species, or groups of species, of which it is difficult to say to which group they should be assigned. But, unfortunately all their works have too much of the spirit of an advocate, and sometimes there is evidence of special pleading, which is misplaced in a scientific essay.

My firm opinion, founded on forty years' experience, and after having had through my hands perhaps more specimens of animals of different classes than most living zoologists, if not more than any other, is that species are permanent; indeed they appear to me to be the only groups of individuals that seem to be well defined and separated from other groups by a distinct and unvarying character. I fully agree with the observations of Messrs. Bentham and Hooker, the authors of the 'Genera Plantarum,' now being published, "that on the whole the natural grouping of individuals into species, and their limitation as such, is far more easy and satisfactory than of genera and of all the other superior groups."

It is no doubt true, as Mr. Darwin observed in his letter on Heterogenesis to the editor of the 'Athenæum' for the 25th of April 1863, that the "origin or derivation of species from gradual change, however produced, does appear to connect large classes of facts"—that is to say, if such a derivation could be proved; but, unfortunately, during all my experience, and after most careful search (for the origin of species has always been a most interesting subject of my contemplation), I have never found the slightest evidence for the support of such a theory, or the least modification of any species

leading to such an opinion. We have, on the contrary, seen that even when any hybrid specimen has been artificially produced, there is always a strong inclination for the race so produced to return to the original form. And I must consider, as the authors above quoted have stated, that "the fact that species do in botany (and, I may add, zoology) stand out as the most prominent term in the series between individual and class is perhaps the most salient obstacle to the reception of the doctrine of the origin of these through variation by natural selection," or, I would add, any other theory that has been suggested; indeed it appears to be an insurmountable difficulty to the reception of the theory of the gradual modification of species altogether, however much such a theory might, if it were true, explain some of our difficulties*.



Varecia varia.

3. VARECIA.

The cheek and chin surrounded by a fringe of long hair. The

* I would refer to Professor Haughton's paper on the 'Origin of Species,' read before the Natural History Society of Dublin, on the 21st November, 1862, as a most excellent corrective of such fallacious theories.

ears pencilled at the end. The wrist hairy. The skull elongate. Face tapering, broad behind and shelving on the sides of the nose; superciliary ridges prominent, much higher than the forehead.

1. VARECIA VARIA. B.M.

Lemur macaco, Gmelin.
Lemur varius, Geoff.
Maki vari, Buffon, H. N. xiii. 178, t. 27.
Prosimia macaco, Gray.
Fur black and white-varied.
Hab. Madagascar (*Brit. Mus.*).
Skull, with the face much lengthened, tapering. The nose high, shelving on the side to the central ridges. The grinders large; the upper cutting teeth one before the other, on the side of the projecting intermaxillaries. The interorbital space very narrow and depressed.
Length of skull 3″ 9‴, breadth at zygomatic arch 2″.

2. VARECIA NIGRA. B.M.

Lemur macaco, Linn.
Lemur niger, Geoff. 1812; Schreb. Säugeth. t. 40 *a*; Peters, Mossamb. 21.
Fur uniform black.
Hab. Madagascar (*Brit. Mus.*).

3. VARECIA RUBRA. B.M.

Lemur ruber, Geoff. 1812.
Fur red; wrist or ankles more or less white.
Hab. Madagascar (*Brit. Mus.*).
Skull wider, orbit more diverging, and the side of the nose higher and flatter, than in *V. varia*.

4. VARECIA LEUCOMYSTAX.

Lemur leucomystax, Bartlett, P. Z. S. 1862, p. 347, pl. XLI.
Grey; patch on lower part of back and fringe round the face white.
Hab. Madagascar; living in the Zoological Gardens.

4. LEMUR.

Face without any ruff. Ears hairy externally. The hand with a bald line up the inside of the wrist, ending in a bald spot above. The tail ringed. Upper cutting teeth subequal, rather shelving. Skull with the forehead convex; face rather compressed, round above.

LEMUR CATTA, Linn. B.M.

Macaco, Buffon, xiii. t. 22.
Prosimia catta, Lesson.
Hab. Madagascar.
Skull quite adult, length 3″ 2‴, breadth 1″ 10‴; the interorbital space flattened, narrow; forehead convex.

5. Prosimia.

The head without any ruff or fringe. The ears hairy externally, naked at the tip, more or less exposed. The wrist hairy. The skull elongate; the face produced, rather compressed on the sides, rounded above; forehead flat.

* *Temple, cheek, forehead, and crown white.*

1. Prosimia albifrons. B.M.

Lemur albifrons, Geoff.; Audeb. Makis, t. 3; Bennett, Zool. Gardens, i. 299, fig.

Grey-brown, hairs minutely punctulated; face and end of the tail black; hinder part of the head, including the forehead, cheek, temple, and base of ears, pure white; chest, belly, and inside of the limbs whitish grey.

Hab. Madagascar (*Brit. Mus.*). Living in the Zoological Gardens.

** *Temple, under the ears, and throat white.*

2. Prosimia nigrifrons. B.M.

Lemur nigrifrons, Geoff.; Bennett, Zool. Gard. i. 301, fig.

Blackish or grey, greyer on the sides beneath; base of the ears reddish white; cheek, throat, and chest white; nose grey; orbits, forehead, cheeks, and end of the tail black or blackish.

Hab. Madagascar (*Brit. Mus.*).

*** *Temples coloured like the back.*

3. Prosimia melanocephala. (Pl. XVIII.) B.M.

Fur yellowish brown, washed with black; chin and beneath pale rufous; head black above; cheeks, under the ears, with a convex puff of hair of the same colour as the back; tail brown, blacker at the end; hands and feet dark reddish brown.

Young of same specimen (perhaps a hybrid with some other yellow-puffed species): head rather paler; spot on side of the neck rather yellower and more silky and puff-like.

Hab. Madagascar (*Brit. Mus.*).

4. Prosimia mongoz. B.M.

Lemur mongoz, Linn.

Mongous, Buffon, H. N. xiii. 298, t. 26.

L. albifrons of Menageries.

Fur reddish grey; throat, chest, and beneath reddish grey; the crown of the head black; face, chin, streak up the forehead and across the crown of the head black; cheeks and side of the forehead iron-grey.

Madagascar.

The specimens of this species vary in the breadth of the band or streak on the head, but it is also known by the black nose and the

iron-grey spot on each side of the forehead. Skull elongate, length 3·6, breadth 2·0; canines very large; interorbital space broad, convex; forehead flat; orbits produced on the sides.

**** *Temples rufous; the hairs elongated (forming a kind of whisker) beneath.*

5. PROSIMIA RUFIFRONS. B.M.

Lemur mongoz, Schreb. Säugeth. i. t. 39 *a* (moderate).

Lemur rufifrons, Bennett, P. Z. S. 1833, p. 106; Fraser, P. Z. S. 1845; Zool. Typica, t. (bad).

Fur grey, with two small white cross streaks on each side of the rump; throat and beneath rufous; nose and line up the middle of the forehead black; sides of nose, cheeks, and large spot on each side of the forehead white; tail blackish, rather rufous at the base.

Hab. Madagascar (*Brit. Mus.*).

Both Schreber's and Fraser's figures leave out the peculiar stripes on the side of the rump.

Lemur rufus (Geoff.), *Maki roux* (Audeb. Makis, t. 2), seems to resemble this species, but we have it not; it may be only a variety.

Lemur rufiventer (I. Geoff. Cat. Mamm. 71) and *Lemur flaviventer* (I. Geoff. Cat. Mamm. 72) are probably allied species.

6. PROSIMIA XANTHOMYSTAX. (Pl. XVII.) B.M.

Lemur xanthomystax, Gray, B.M.

Fur grey-brown, with a broad, black, indistinct dorsal streak; chin, chest, and beneath pale rufous; head and back of neck black; a large puffy spot on each side of the throat under the ear bright rufous; a large spot on each side of the forehead over the eyes grey; tail brown, blackish-washed.

Hab. Madagascar (*Brit. Mus.*).

This may be easily known from *P. mongoz* (with which it agrees by having the grey spot on the forehead) by the dorsal streak, and the red puff on the temples.

***** *Temples and cheeks and sometimes the side of the neck rufous.*

7. PROSIMIA CORONATA. B.M.

Lemur coronatus, Gray, Ann. and Mag. N. H. 1842, x. 257; Voy. Sulphur, t. 4.

Fur pale grey; beneath reddish white; face white; temple, cheeks, and forehead rufous; spot on the crown of the head black; tail blackish, rufous at the base.

Var. white, *Maki albine*, Chenu, Ency. N. H. Quadr. 263, fig.

Hab. Madagascar (*Brit. Mus.*).

Lemur chrysampyx (Scheurmann, Acad. Brux. xxii., 1848), according to M. I. Geoffroy, differs from the foregoing species in the absence of the black spot on the crown, and the white colour of the lower and outer parts.

8. PROSIMIA ALBIMANA. B.M.

Lemur mongoz, Audeb. Makis, t. 1.
Lemur albimana, Geoff.

Fur dark iron-grey, with a black streak on the hinder part of the back, and a black broad crescent at the base of the tail; nose, outer base of the ears, hands, chin, chest, and beneath white; temples and sides of the throat rufous; spot on forehead and underpart of orbit blackish.

Hab. Madagascar (*Brit. Mus.*).

9. PROSIMIA ANJUANENSIS. B.M.

Lemur anjuanensis, Geoff.

Fur reddish iron-grey; chin and beneath paler; nose, head, nape, front of the body, and shoulders blackish grey; temples and outer base of the ears black; a large roundish spot on the side of the neck, under the ears, rufous; tail blackish-washed.

Hab. Madagascar (*Brit. Mus.*).

Easily known from *P. collaris* by the small size of the rufous spot on the side of the neck, and the black nose and head.

10. PROSIMIA COLLARIS. B.M.

Lemur collaris, Geoff.

Fur dark or pale iron-grey; nose, outer base of the ears, chin, throat, and beneath white; orbits, temples, side of the face, chin, and sides of the throat rufous; tail iron-grey, rufous at the base.

Hab. Madagascar (*Brit. Mus.*).

This species differs from *P. albimana* in the rufous spot on the side of the face being more extended, and the hands and feet are dark iron-grey. There is no dorsal stripe nor crescent at the base of the tail.

Prosimia rufifrons is easily known by the two small white stripes across each side of the rump.

P. albifrons by the white back of the head.

P. melanocephala by the black head and yellowish fur.

P. xanthomystax by the indistinct broad black stripe down the back.

P. albimana by the black dorsal streak and crescent at the base of the tail, and white feet.

P. coronata and *P. collaris* by the rufous band across the forehead.

b. *Feet elongate; tarsus longer than the metacarpus; ears exposed, nakedish.*

6. OTOGALE.

Ears large, membranaceous, contractile backwards. Cutting teeth $\frac{2-2}{6}$; upper slender, equal, nearly in the same line; lower close together, and projecting horizontally forwards. Skull rather elongate, broad. Anterior false grinder elongate, erect, conical, compressed,

with a slight notch at each side near its base; the lower canine large, conical, bent up; grinders large, broad.

* *Skull and face elongate.* Otogale.

1. OTOGALE GARNETTII. B.M.

Otolicnus garnettii, Ogilby, P. Z. S. 1838, p. 6.

Pale brown, yellowish beneath, with a white narrow band on each side of the loins. Tail half the length of the body; perhaps injured.

Hab. Port Natal.

Skull, length 2″ 11‴, breadth 1″ 10½‴.



Otogale garnettii.

2. OTOGALE CRASSICAUDATA. B.M.

Otolicnus crassicaudatus, Peters, Mossamb. t. 2. t. 4. f. 1–5; Schrank. Cat. Bones B. M.

Galago crassicaudatus, Geoff. 1812.

Lemur crassicaudatus, Blainv.

Tail very long and thick.

Hab. Port Natal; East and West Africa; Mozambique(*Sundevall*).

Skull, length 2″ 7‴, breadth 1″ 8‴.



Otogale pallida.

** *Head short, broad; face short, conical; eyes large.* Euoticus.

OTOGALE PALLIDA, n. sp. (Pl. XIX.) B.M.

Fur pale grey, whitish beneath, with a roundish white spot on the

side over the axilla and the groin; tail very long, cylindrical, nearly half as long again as the body and head.

Hab. Fernando Po (*Capt. Burton*, H. M. Consul).

Hind feet 2″ 6‴. Skull, length 2″, breadth 1″ 4‴.

Skull: orbits prominent and produced on the sides, wider than the zygomatic arch.

This species, which has the teeth exactly like the other Otogales, by the shortness of its head and the large size of the eyes and orbit of the skull forms a passage to the Galagoids*.

II. *The head short, subglobose; face short, tapering; eyes very large.*

The skull is short, broad, depressed. The face very short, conical, tapering. Orbits very large, the zygomatic arches slender.

* *The hind legs much longer than the fore; fingers free, well developed; tail elongate, hairy.*

† *Feet short, broad; ears small, hairy, hidden; teeth* 30, *viz. grinders* $\frac{5-5}{5-5}$, *cutting teeth* $\frac{2}{4}$. Microrhynchina.

7. MICRORHYNCHUS, Jourdan, 1834.

Avahis, I. Geoff. 1835.
Indris, A. Smith, 1834.
Semnocebus, Lesson, 1840.

Tail elongate, cylindrical, hairy. Ears hidden under the fur. Nostrils separated by a narrow septum. Hind foot short and broad. Claws elongate, convex, acute; claw of front toe elongate, cylindrical.

MICRORHYNCHUS LANIGER. B.M.

Lemur laniger, Gmelin.
L. lanatus, Schreb.
Avahis laniger, I. Geoff.

Brown, varied; rump, spot over groin, and beneath whitish, with a narrow white lunate band on the forehead.

Hab. Madagascar.

Length of foot about $2\frac{1}{2}$ inches.

†† *Feet short and broad, about two-thirds the length of the shank or shin; teeth* 36, *grinders* $\frac{6-6}{6-6}$, *cutting teeth* $\frac{2-2}{6}$, *the upper ones placed one before the other.* Galagonina.

8. HAPALEMUR, I. Geoff.

Hapalolemur, Giebel, 1859.

* Since this paper has been in print, I have procured from among some fragments of skins belonging to M. Du Chaillu a very imperfect skin, in a bad state, of a Lemur which appears to belong to this species; but it has a small white tip to the tail (probably accidental). It is marked "*Otolicnus apicalis*," so that this white-tipped variety is probably the animal noticed under that name in the Appendix to M. Du Chaillu's 'Travels,' p. 471.

Cutting teeth $\frac{2-2}{6}$, the upper ones behind the other on each side, crowded on the inside of the canine. Ears short and hairy. Tail elongate, hairy. Hinder limbs much longer than the front ones.

1. HAPALEMUR GRISEUS, I. Geoff. Cat. Méth. 75. B.M.

Lemur griseus, Geoff. 1796.
Maki gris, Buffon, Supp. vii. t. 24.
Cheirogaleus griseus, Van der Hoeven, Tijdsch. 1844, xi. t. 1. f. 1 (skull).

Dark iron-grey, with a yellowish tinge; hairs black, with a subapical reddish band; underside rather paler.

Hab. Madagascar. Shot in the woods.

The upper cutting teeth are placed one before the other, and crowded back so as to be on the inner side of the canine.

2. HAPALEMUR OLIVACEUS, I. Geoff. 1851.

Hab. Madagascar.

9. CHEIROGALEUS, Geoff.

Myspithecus, Fr. Cuv. 1833.
Myoxicebus et *Cebugale*, Lesson, 1840.
Cheirogaleus, Wagner, 1840.

Head very short, muzzle tapering. Ears small, hidden, bald on the edge. Cutting teeth $\frac{2-2}{6}$, the middle larger, in an arched series on side of intermaxillaries; the first false grinder in the upper jaw large, conical, erect, like a small canine, and in the lower jaw also rather large. Hind legs rather elongate, more equal than in the true Lemurs. The hind feet are short and broad, about two-thirds of the length of the shank.

M. Isidore Geoffroy, in his account of the genus *Hapalemur*, states that in *Cheirogaleus* "the cutting teeth are in straight cross lines, and the ears are membranaceous." If this is correct, the species here described are not *Cheirogalei*.

1. CHEIROGALEUS MILII, Geoff. 1828.

Maki nain, F. Cuv. Mamm. 1821.

"Grey-brown; palpebræ, sides of mouth, and whiskers black; throat, chest, and belly white; ears moderate, scarcely exserted, edge smooth, crest hairy; head globose; muzzle broad, depressed."

Hab. Madagascar.

2. CHEIROGALEUS TYPICUS, A. Smith, S. African Journal, ii.; Gray, Cat. Mam. B. M. 17. B.M.

Reddish brown; cheeks, throat, and beneath white; orbits blackish; tail cylindrical; fur on outside of ears blackish.

Hab. Madagascar.

Length of foot 2″; length of head about 2″, and width about $1\frac{1}{2}$″, as well as it can be measured on a stuffed specimen.

3. CHEIROGALEUS SMITHII, Gray, Ann. & Mag. N. H. 1842; Cat. Mam. B. M. 16. B.M.

Microcebus pusillus, Waterhouse, Cat. Mus. Z. S. ed. 2. p. 12. no. 89.
Le Rat de Madagascar, Buffon, Supp. iii. t. 20.

Pale bay; chin and beneath pale yellow; outside of ears pale brown; orbits blackish; streak on nose and between the orbits white; the hairs are slate-colour at the base.

Hab. Madagascar.

Length of hind foot 1″ 2‴.

This specimen is about one-fourth the size of the *C. typicus*. It may be the young of it; but the teeth, so far as one can see in a stuffed specimen, appear to be perfect.

Le Rat de Madagascar (Buffon, Supp. iii. t. 20) well represents this animal; but it has been considered as the type of the genus *Microcebus*, which is described as having a long slender hind foot.

We have a specimen in spirits, from the Zoological Society, that was named *Microcebus pusillus* by Mr. Waterhouse in the second edition of the Catalogue of the Museum of that Society, which agrees with this animal in almost all particulars; but the ears appear larger and bald, and the fur of the under part of the body whiter—perhaps both particulars arising from its having been preserved in spirits. The length of the feet and the teeth agree; but the feet, and especially the hands, are white and hairy, while in the dry specimen they are brown and nearly without hair.

It is sad to observe the persistence with which an error may be endowed. Vigors and Horsfield, in the 'Zoological Journal' in 1828, described an American Douroucouli as a Lemur, under the name of *Cheirogaleus commersonii*, believing that it came from Madagascar. This error was soon corrected; but Lesson retains it among the Lemuridæ, and re-named it *Glicebus rufus*; Schinz, in his 'Systematic Catalogue,' published in 1844, still retains it, and calls it *Scartes rufus* (vol. i. p. 102); and Giebel, 'Die Säugethiere,' published in 1859, p. 1018, still regards it as a *Cheirogaleus*.

10. LEPILEMUR? I. Geoff. 1851.

Microcebus, Waterhouse & Peters.

Cutting teeth $\frac{2-2}{6}$, the two front upper longer. Ears elongate, membranaceous, prominent. Foot broad, shorter than the shank. Tail cylindrical, covered with close-set short hair.

* *Back uniform.*

1. LEPILEMUR MURINUS. B.M.

Lemur murinus, Miller, Cym. Phys. 25. t. 13.
Microcebus murinus, Waterh. Cat. Mus. Zool. Soc. 12. no. 90 (♂).
Galago minor, Gray, Ann. and Mag. N. H. 1842.
? *Little Macaco*, Penn. Quad.

Back pale reddish grey; underpart of the fur deep black; broad

streak up the nose between the orbits, the cheeks, and the underside whitish; front of the orbits on the sides of the nose brown; tail rather browner, slender, rather longer than the head and body; ears rather large, rounded at the end, pale, covered with short scattered hairs on the outside.

Hab. Madagascar; from Zoological Society.

Miller's figures very well represent this animal, but the tail is more bushy and browner than our specimens; the feet are of the proper size and form. The skull of the adult male has a rather longer nose than those of the typical *Galago*; and the orbits are very large, but scarcely so large as some of the species of that genus. It is 1″ 2⅓‴ long, and 9½ lines broad. The two front upper cutting teeth are large and bifid, the inner ones small and cylindrical. The upper canines are erect; the lower ones are decumbent. The first and second upper false grinders are slightly conical and compressed.



Lepilemur murinus.

2. LEPILEMUR MYOXINUS.

Microcebus myoxinus, Peters, Mossamb. Säugeth. i. 14, t. 4.

Hind feet short, two-thirds of tibia.

Hab. Eastern Madagascar.

The figure of Dr. Peters agrees pretty well with our specimen of *L. murinus*; but the whole colour of the fur is rather darker, and the ears are larger. The figure of the skull also agrees well with that of *L. murinus*. This is not a *Microcebus* as now restricted; the feet are too short and broad for that genus.

Skull, length 1″ 4‴ (according to the figure), breadth 10½‴.

It is very like my *Cheirogaleus smithii*, but the ears are too large. The ears are very apt to be unnaturally stretched in the stuffing, or the converse and allowed to shrink in the drying.

3. LEPILEMUR MUSTELINUS, I. Geoff. Cat, Mamm.; Archives du Mus. t. .

Rufous; throat white; forehead and cheeks grey; lower part of body yellowish; the tail, hands, and lower part of the legs yellowish grey; outer side of the last third of the tail brown; tail two-thirds the length of the body; ears large, rounded, membranaceous, dark.

Length of head and body 14″, of tail 10″.

Hab. Madagascar, 1842.

The description of this animal agrees in most particulars with *Lepilemur*, but it is said to have no upper cutting teeth. May not this be a peculiarity of the single specimen on which the species is founded?

** *Back with a black streak, forked on the occiput.*

4. LEPILEMUR FURCIFER.

Lemur furcifer, Blainv. Osteogr. 1839.
Cheirogaleus furcifer, I. Geoff.
Cheirogale, Chenu, Encycl. Quadrum. p. 269, f. 218?
"Grey; back with a streak, forked on the occiput and extended to the eyes; end of the tail black."
Hab. Madagascar.
Dr. Dahlbom observes that this species would be a *Lepilemur* if it was without upper cutting teeth; but as our *Lepilemures* have these teeth, I think it had better be placed in this genus.

11. CALLOTUS.

The ears very long, membranaceous, the hinder edge contractile, so as to fold up the conch like the long-eared Bats. Teeth ——? canines strong. Feet broad, short, only two-thirds the length of the shank. The toes broad, with distinct roundish disks. The thumb very broad. The eyes very large; the iris very contractile, leaving a very small, erect, oval or lanceolate pupil. Tail very long, with spreading hairs, tapering at the end.

CALLOTUS MONTEIRI.

Galago monteiri, Bartlett, MS.
Uniform pale grey; side of the nose rather dark; hair of the body soft, dark slate-colour, with long, white, rather crisp tips.
Hab. Western Africa: Angola.
This genus chiefly differs from *Galago* in the shortness, breadth, and strength of the hind feet. The animal is only known from a specimen living in the possession of Mr. Monteiro, who has had it for more than a year. It is of the size of a small Common Cat; larger than *Otogale crassicaudata*.

††† *Feet elongate, slender, nearly as long as the shank or shin; tarsal bone longer than the metatarsal.*

12. GALAGO.

Cheirosciurus, Cuv. & Geoff. 1795.
Galago et *Galagoides*, A. Smith.
Scartes, Swainson.
Ears large, pellucid, membranaceous, hinder edge contractile. Cutting teeth $\frac{2-2}{6}$; the upper equal, slender; the lower shelving upwards. The upper canines erect; the lower ones decumbent, shelving forwards and upwards. The first false grinder short, broad, three-lobed, like the others, and not prominent and erect like the canines.

* *Tail thick, with spreading hairs; fingers and toes very slender, elongate; the upper cutting teeth placed in an arched line, one before the other.*

1. GALAGO ALLENII. B.M.

Galago allenii, Waterhouse, P. Z. S. 1837, p. 87.

Fur dark, blackish brown; forehead, rump, and base of tail grey; arms and legs reddish-washed; nose-streak and underside of body whitish; tail black; toes and fingers very slender, free; ears moderate.

Length of hind foot 2″ 10‴. Skull (imperfect), length about 2″ 2‴, breadth 1″ 5‴.

Var. *gabonensis*. Skull small, 2″ 0‴, width 1″ 4½‴.

Hab. West Africa: Gaboon; Fernando Po.

There is a considerable difference in the two skulls of this species which we have, though the skins resemble each other very closely, so much so that it would not be easy to distinguish them as varieties. The one from Fernando Po is larger, and the upper cutting teeth form an arched series, and the grinders are very large and broad. The one from the Gaboon is rather smaller in size, the upper cutting teeth are in nearly the same straight transverse line, and the grinders are scarcely three-fourths of the general width of those of the other skull. Both skulls seem to have their perfect and permanent teeth. Probably this may arise from the sex of the specimen; but the sexes are not marked, and there is no external character to distinguish them. In a third and younger specimen the upper cutting teeth are subequal, and placed one before the other; so that this seems to be the normal position of the teeth.

** *Tail clavate, hair of lower part adpressed, of end spreading; the fingers and toes broader, shorter; upper cutting teeth very slender, in a straight cross line.*



Galago maholi.

2. GALAGO MAHOLI.

Galago maholi, A. Smith, Illust. S. African Z. t.
Otolicnus galago, Wagner, Säugeth. Suppl. i. 292?
G. senegalensis, var., I. Geoff. Cat. p. 81.
?*Lemur* ——, Brown, Illust. Zool. t. 44, 1776.
Scartes ——, Swainson, Class. Mamm. 352, 1838.

Brownish grey; nose-streak, face, throat, and beneath whitish;

ears large; tail elongate, rather longer than head and body, subclavate, rather browner than the back.

Length of hind foot 2″ 5‴.

Var. smaller; orbits darker.

Length of hind foot 2″ 3‴. Skull, length 1″ 6‴, breadth 1″ 0‴.

Hab. South Africa.

Brown's figure seems to represent this species; but the hind foot is too short—having about the same proportion, compared with the shank-bone as *Lepilemur*; therefore I have only referred it to this species with doubt.

The fine male specimen which served as the type of Sir Andrew Smith's figure has the orbits of the same colour as the rest of the face; in two other rather smaller specimens in the Museum the orbits are darker, in one nearly black.

There are two skulls of this species in the Museum Collection, both from South Africa. They vary very slightly in the size of the teeth, especially in the breadth or squareness of the grinders. The upper cutting teeth are cylindrical, elongate, of the same size, and placed in a nearly straight cross line; the first upper false grinder is broad and lobed, like the second one.

3. GALAGO SENEGALENSIS, Geoff. 1796; I. Geoff. Cat. 81. B.M.

Galago geoffroyii, Fischer.

Galago acaciarum, Lesson.

Lemur galago, Schreb. Säugeth. t. 38 B.

Ears oblong, rounded at the end; fur grey; nose-streak, chin, and beneath white; tail and feet blackish brown; tail rather longer than the body and head; orbits blackish.

Length of hind foot 2″ 3‴, of head 1″ 7‴.

Hab. West Africa: Senegal; Gambia.



Galago sennariensis.

4. GALAGO SENNARIENSIS.

Galago (*senegalensis*) *sennariensis*, Kotzschy, MS. B.M.

Bluish grey; face and feet blacker; orbits black; throat and under part of body and inside of limbs white; tail very long, one-half longer than the body and head, blackish; ears very large, rounded; fingers and toes slender.

Length of hind foot 2″. Skull, length 1″ 6‴ (about the back being imperfect), width 1″ 2½‴.

Hab. "Sennaar, on the Nile."

The upper front cutting teeth are very slender, longer and more produced, the upper grinders are broader and squarer, and the hinder one is more triangular than in *G. maholi*.

There are three specimens of this species in the Museum, unfortunately not in a good condition; but they all decidedly differ from *G. maholi*, especially in the length of the toes, and in the fingers and toes being more slender. These three species are very similar, and I think they may easily be distinguished by the length and colour of the tail. *G. maholi* and *G. senegalensis* have the tail only rather longer (not more than one-fifth) than the body and head. In *G. maholi* the tail is rather dark, but grey; in *G. senegalensis* it is much darker, being blackish brown. In *G. sennariensis* the tail is much longer than the body and head, and black. There seems also to be some difference, although difficult to describe, in the proportion of the ears and the head.

The following species have not come under my observation:—

1. *Galago conspicillatus*, I. Geoff. Cat. p. 81.

Ears acute, triangular, acute at the tip; fur above black-brown, beneath grey; tail elongate.

Hab. Port Natal; South Africa.

2. *Otolicnus peli*, Temm. Esquiss. Zool. 42.

3. *Galago senegalensis*, Rüppell, Abyss. Wirbelth.

4. *Otolicnus senegalensis*, Peters, Mossamb. ii. t. 4. f. 11–13.

Hab. Mozambique.

5. *Otolicnus teng*, Sundevall, Königl. Petersb. Akad. 1842, p. 201.

*** *Tail slender, cylindrical; ears smaller.*

Hemigalago, Dahlbom, 1857.

"A new genus, intermediate between *Galago* and *Microcebus*, I. Geoff."



Galago demidoffii.

5. GALAGO DEMIDOFFII, Fischer, Mém. S. N. Mosc. (1806). B.M.

Hemigalago demidoffii, Dahlbom, Stud. p. 230, t. 10.

Galago senegalensis, L. Fraser.

Galago murinus, Murray, Edinb. Phil. Journ. n. s., x. t. 11.

Brown; side of face dark; nose-streak white, narrow; chin, throat,

and below reddish grey; tail one-half longer than the body and head, darker at the hinder half.

Skull, length 1″ 5‴, width 10½‴. Length of hind foot 1″ 8‴.

Hab. West Africa: Gaboon.

There are several specimens of this animal in the Museum Collection. The skin of the adult measures about 5 inches long, from the tip of the nose to the base of the tail; the tail is 7½ inches long; the hind foot and shin are about 1 inch 8 lines long. There are some smaller specimens in spirits, which appear to be younger, which have the hind foot only 1 inch and from 4 to 6 lines long.

I am induced to suppose that Mr. Murray's *Galago murinus* from Old Calabar is the young of this species, as the hind foot is figured about 1½ inch long.

The skull without a lower jaw, which in the Museum Catalogue of Bones is put under *Microcebus myoxinus* (p. 33), evidently belongs to this species.

**** *Tail cylindrical, elongate; ears small, partly hidden.*

Microcebus, Geoff. 1828.
Myscebus, Lesson, 1840.
Myocebus, Schinz, 1844.

6. GALAGO MADAGASCARIENSIS, Geoff. Tab. d. Quadr. 1812.

Microcebus rufus, Geoff. Cours Mam. 1825; I. Geoff. Cat. 80.
Lemur pusillus, Geoff. Bull. Phil. i. p. 89, 1795.
Microcebus rufus, Schinz, p. 107, 1841.
Petit mongous, Buffon, xiii. 177?
Rat de Madagascar, Buffon, Suppl. iii. p. 147, t. 20?
Hab. Madagascar.

Buffon's figure of *Le Rat de Madagascar*, which is the type of *Lemur pusillus*, represents the animal as having a short hind foot, and in that particular better represents my *Cheirogaleus minor* than any animal that M. I. Geoffroy would place with the *Galagina*, or M. Dahlbom with the *Macrotarsæ*. I have never seen a *Lemur* with small ears and a long foot; so that I suppose a true *Microcebus* has not occurred to me; and I doubt much if Buffon's figure represents the genus.

** *The fore and hind feet nearly equal in length; feet short, broad.*

† *Great toe very broad; tail none; index finger short.* Lorisina.

13. NYCTICEBUS, Cuvier, 1795.

Bradicebus, Geoff.
Bradycebus, Blainv.; Lesson.
Head subglobose. Body and limbs stout and strong.

NYCTICEBUS TARDIGRADUS. B.M.

Stenops tardigradus, Van der Hoeven.
Hab. Borneo and Sumatra.

2. NYCTICEBUS JAVANICUS, Geoff. 1812; V. d. Hoeven, Nat. Tijdschr. viii. p. 345, t. 6. f. 1, 2, 3, t. 7. f. 5–7. B.M.
Hab. Java.

14. LORIS.

Prosimia, Cuv. & Geoff. 1798.
Stenops (part), Illiger.
Arachnocebus, Lesson, 1840.
Head small; nose conical; ears thin, produced. Body and limbs elongate, slender.

LORIS GRACILIS, Linn. B.M.

Loris, Buffon, xiii. t. 30.
Loris ceylonicus, G. Fischer.
Hab. Ceylon. India: Pondicherry.
Skull and skeleton in British Museum.

†† *The hand broad; the index finger abortive, clawless; eyes moderate.* Perodicticina.

15. PERODICTICUS, Bennett.

Tail shorter than the body. The hands and feet large. Fingers and toes free at the ends; the index finger rudimentary, but distinct. Lower cutting teeth large and prominent, and projecting. The apices of the vertebræ of the back, neck, and withers projecting beyond the skin, like prickles.

PERODICTICUS POTTO. B.M.

Perodicticus geoffroyi, Bennett, P. Z. S. 1830, p. 109; Murray, Proc. Roy. Phys. Soc. Edinb. 1860, p. 191. fig. of hand and feet.
Potto bosmani, Lesson.
Hab. Sierra Leone; West Africa.
Skull and skeleton in British Museum.

16. ARCTOCEBUS.

Tail very short. Hands and feet small, with the lower phalanges (not including the thumb) united in the skin, the two upper joints free; the index finger abortive, reduced to a tubercle. Lower cutting teeth small, hyaline, hidden by the lips.

ARCTOCEBUS CALABARENSIS.

Perodicticus calabarensis, Smith, Proc. Roy. Phys. Soc. Edinb. 1860, p. 172. f. 1, 2 (hands), f. 3, 4 (head).
Hab. West Africa; Old Calabar.

Fam. II. TARSIDÆ.

Cutting teeth $\frac{4}{2}$, erect, cylindrical, conical; the two upper front elongate, acute; the lower ascending obliquely, crowded between the canines; grinders $\frac{6-6}{6-6}$. The fingers and toes free, well developed;

the first and second hind toes shorter, each with an elongate curved claw. Head short. Eyes and orbits very large. Limbs free, elongate. Foot very long, as long as the shin. Tail elongate, hairy.

TARSIUS, Storr, 1780; Daub. 1792.

Macrotarsus, Cuv. & Geoff.
Tarsier, Lacép.
Cephalophacus, Swainson, 1835.
Hypsicebus, Lesson, 1840.

TARSIUS SPECTRUM, Geoff.; Dahlbom, Studia, t. 11 (skeleton).
Tarsius pallasii, Geoff. B.M.
Tarsius daubentonii, Audeb.
Tarsius bancanus, Horsf. Java, t.
Lemur tarsius, Erxl.
Lemur spectrum, Pallas.
Didelphis macrotarsus, Gmelin.
Hab. Borneo; Celebes.

Fam. III. DAUBENTONIADÆ.

Cheiromyidæ, Bonap.
Glirisimiæ, Dahlbom.

Cutting teeth $\frac{2}{2}$, compressed, large; canines none; grinders $\frac{4-4}{3-3}$. Limbs free. The fingers and toes well developed. The fingers very long and slender. The great toe broad. The index finger with a sharp curved claw. Face short. Tail elongate, hairy.

DAUBENTONIA, Geoff. Decad. Philos. iv. p. 193, 1795; Dahlbom, 1851.

Aye-Aye, Lacép. 1799.
Cheiromys, Cuvier, 1800.
Chiromys, Illig. Prod. 1811.

Cuvier refused to use the name proposed by Geoffroy, because it was given in honour of a person; but as this rule has not been generally observed, the objection ceases to be operative.

DAUBENTONIA MADAGASCARIENSIS, Geoff.; Dahlbom, Studia, p. 236, t. 12. B.M.
Aye-Aye, Sonnerat, Voy. Ind. ii. p. 138, t. 76. 1782.
Sciurus madagascariensis, Gmelin.
Cheiromys madagascariensis, Geoff. 1803; Owen, Trans. Zool. Soc. 1863.
Hab. Madagascar.

Fam. IV. GALEOPITHECIDÆ.

Cutting teeth $\frac{4}{3}$, the upper middle small, side one compressed, lower shelving, pectinate; canines $\frac{1-1}{1-1}$, like the molars; grinders $\frac{5-5}{5-5}$. Limbs and tail united by a membrane covered with fur. Limbs

short, subequal. Fingers and toes short, subequal, compressed, united by a membrane.

GALEOPITHECUS.

1. GALEOPITHECUS VOLANS. B.M.

Lemur volans, Linn.
Galeopithecus variegatus, Geoff.
Galeopithecus rufus, Geoff.
?*Galeopithecus ternatensis*, Geoff.
G. temminckii, Waterh.
Galeopithecus undatus, A. Wagner; Schreb. Säugeth. i. p. 326, t. 307 *b*.
Hab. Java; Sumatra; Borneo; Siam.

2. GALEOPITHECUS PHILIPPINENSIS, Waterhouse, P. Z. S. 1838, p. 119. B.M.
Hab. Philippines.

?3. GALEOPITHECUS MACROURUS, Temm.

7. Descriptions of Two New Genera of Lizards (Holaspis and Poriodogaster, A. Smith, MS.). By Dr. J. E. Gray, F.R.S., etc.

(Plates XX., XXI.)

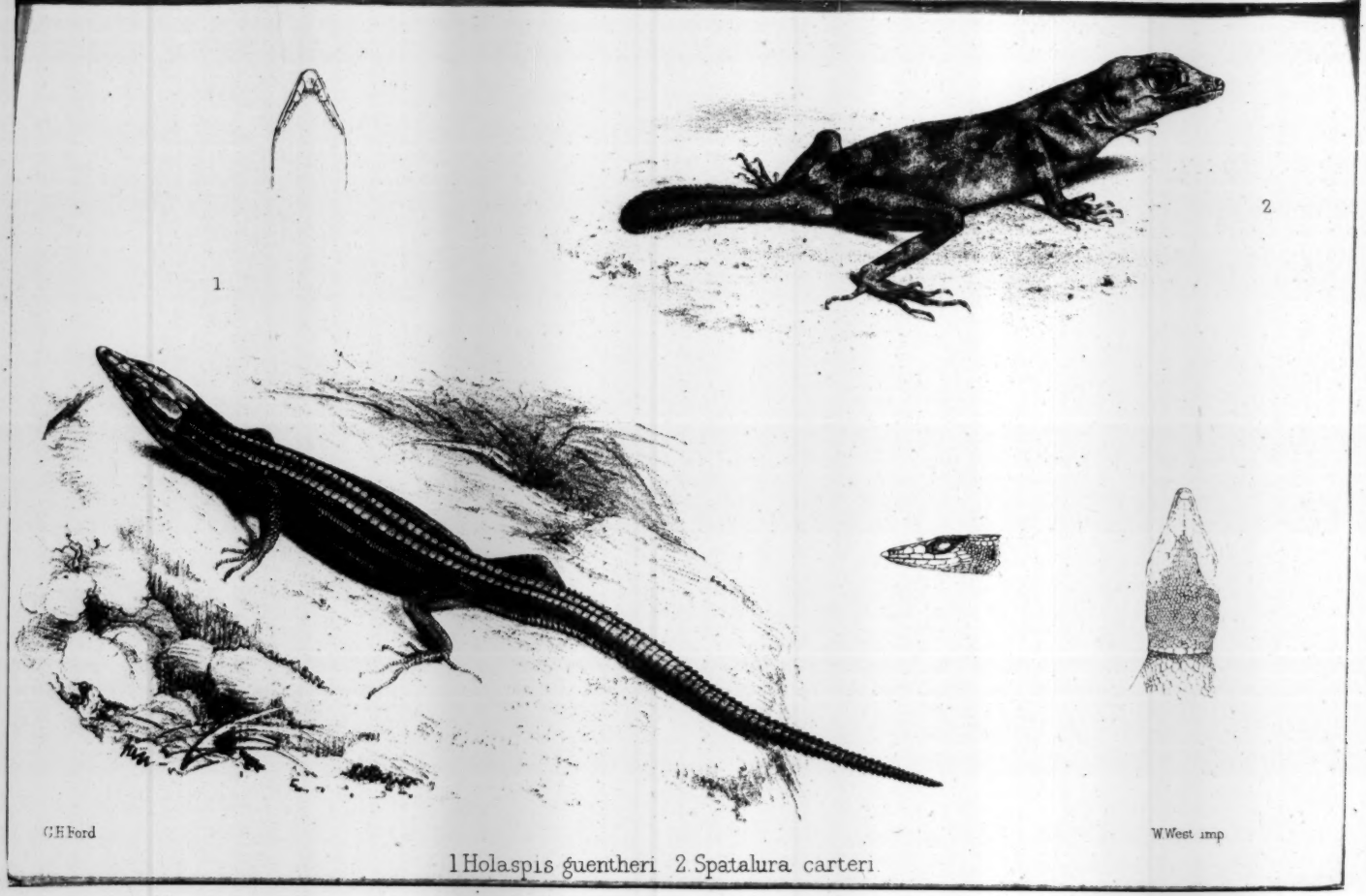
Sir Andrew Smith, M.D., having most kindly sent to the collection of the British Museum two most interesting Lizards, which he has very properly named as the types of two new genera, I hasten to send to the Society a short description of each of them under the MS. names which Sir Andrew Smith has attached to them in his museum.

The first genus is allied to the family *Lacertinidæ*, and is at once known from all the genera of that group by the peculiarity of having two series of broad band-like scales down the vertebral line of the back, which are continued on the upper surface of the base (and probably of the whole length) of the tail; but the single specimen which I have seen has evidently had the end of the tail reproduced and covered with abnormal scales. The tail is depressed, and has a series of prominent keeled scales, forming a dentated keel on each side.

This genus I consider forms a distinct family, which may be called HOLASPIDÆ, distinguished from *Lacertinidæ* by the form of the tail and the peculiarities of the scales.

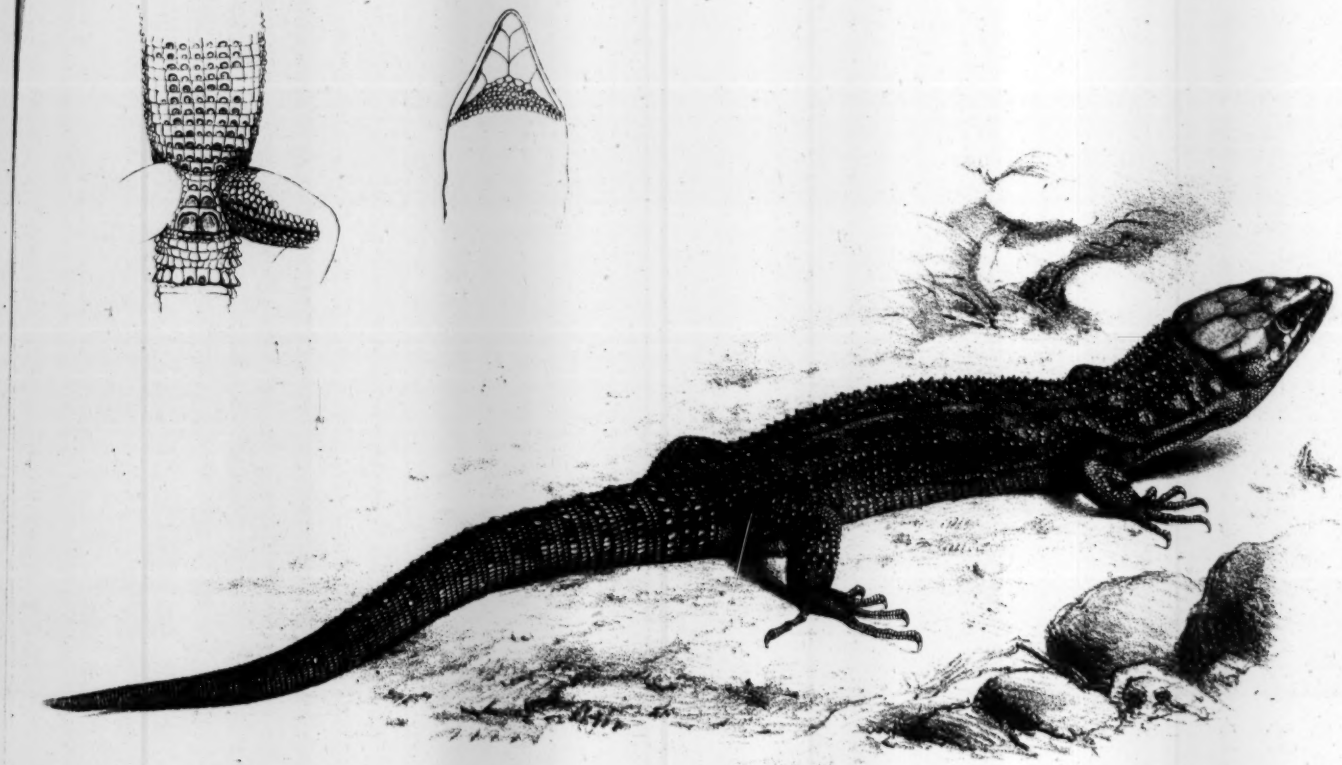
1. HOLASPIS, A. Smith, MS.

Head pyramidical, depressed; crown covered with regular, many-sided shields; side of face shielded; nostrils nearly on the ridges near the front of a single scale with a shield in front of it; labial



1 Holaspis guentheri 2 Spatalura carteri

BRITISH
3 AU 64
MUSEUM



G.H.Ford

W.West imp.

Poriodogaster grayii

BRITISH
3 AU 6
MUSEUM

shields low; temple covered with small scales; eyes lateral; lower eyelids scaly; eyebrow covered with three large shields; ears large, oblong, erect, open; tympanum rather sunk; tongue slender, retractile (?); the apex deeply notched, acute. Body depressed, with a slight keel on each side of the belly. The back and upper part of the neck covered with whorls of narrow elongated keeled scales, with two series of smooth, oblong, transverse shields, one on each side of the vertebral bones. The belly covered with cross series of square smooth shields, placed in few longitudinal series. The throat and neck covered with small rather convex scales, and with a distinct collar formed of a regular series of large half-ovate scales. The legs rather depressed, covered with granular convex scales; the front legs with a series of broad smooth shields on the upper front side; the thighs with two (an upper and lower) series, and the hind legs with an inferior series, of smooth broad shields, like those on the front of the fore legs; the hind feet slightly fringed on the inner side; toes 5 : 5, elongate, slender, unequal; claws acute. The femoral pores small. Vent with a single half-oblong shield in front. Tail depressed, with a fringe of compressed close scales on each side, the sides covered with rings of small convex scales, and with two series of small broad band-like shields on the upper and lower surface.

Mr. Cope has pointed out to me that this genus agrees in many particulars with the genus *Placosoma* of Fitzinger, MS., described by Von Tschudi in an article on the family of *Ecpleopoda* (Arch. für Naturg. 1847, pp. 50 & 58).

The scaling seems very similar; but the body of *Placosoma* is not said to be so depressed and fringed on the sides; and the small part of the tail that remains on the specimen described is not said to be depressed and fringed on the side; and I can hardly believe that Herr von Tschudi would have overlooked such a peculiar form, and therefore I believe they are different.

Herr von Tschudi describes the scales on the upper surface of the small part of the tail that remains, which is only 3 lines long, as small, like those on the sides; but in Dr. Smith's genus the upper surface of the tail is covered with two rows of large shields, like the back.

Placosoma cordylinum is described from a specimen in the Museum at Bonn, on the Rhine, collected by Dr. John Natterer in North Brazil; and it is probable that the *Holaspis guentheri* may also be a Tropical-American form.

HOLASPIS GUENTHERI, A. Smith, MS. (Pl. XX. fig. 1.)

Bluish brown (in spirits), with three bluish-white equidistant regular lines down each side of the head, neck, and body, and a stripe down the front of the fore leg.

Hab. —— ?

The specimen was purchased in Paris without any habitat affixed to it.

The tail has been reproduced, and the reproduced part is of the normal form, fringed and toothed on the sides, but of a different, that is to say, uniform dull leaden colour.

The second genus has many characters in common with *Xantusia* of Baird, and will most probably belong to the family *Xantusiidæ*, as proposed in the 'Proceedings of the Academy of Sciences,' Philadelphia, for 1858, p. 255.

2. Poriodogaster, A. Smith, MS.

Head pyramidical; sides erect; crown flat, hard, bony, covered with very thin polygonal normal shields; superciliary ridge bony, solid; temple covered with a shield; lower jaw thick, bony, solid, covered with a single series of large broad, thin, membranous shields, which are united in a straight line on the middle of the chin; eyes circular, large, lateral, without any eyelids; pupil large, circular; tongue not retractile, broad, flat, attached nearly to the tip, the tip only obscurely nicked; teeth simple; ears oblong, large, with a groove to the angle of the mouth; tympanum sunken; nostrils lateral, anterior in the suture between two nasal shields, the front situated between the upper edge of the rostral and the front odd plate. The sides of the neck and throat covered with moderately sized, round, convex, nearly uniform-sized scales. The throat with two folds on each side, and with a cross fold in front of the chest; these folds are covered with scales of the same size and kind as the rest of the throat. The back of the neck, back, and sides of the body covered with uniform, convex, roundish scales, with numerous scattered, larger, prominent, conical, tubercular scales, placed in longitudinal rows along the centre of the back, and larger and more abundant ones on the sides. The belly covered with cross series of square flat smooth shields, most of which have a dark large pore-like crypt in the middle of their hinder edge; the shields of the chest are smaller, more numerous, and placed in converging lines. The legs strong, covered with round convex scales; the hinder ones armed with larger prominent tubercles on the upper surface. Toes 5 : 5, unequal, slender; claws sharp, curved, the under surface covered with flat shields; femoral pores large, distinct. The front of the vent covered with three pairs of equal flat shields, each having a very large crypt in the middle of its hinder edge, the hinder pair next the vent being the largest. The tail cylindrical, tapering, covered above with rings of square keeled scales, every fourth ring being larger, prominent; the under side with rings of small square shields.

Poriodogaster grayii, A. Smith, MS. (Pl. XXI.)

Brown, yellowish beneath.

Hab. —— ? British Museum.

Mr. Cope, to whom I have shown the specimen of this species, has drawn my attention to the genus *Xantusia* of Professor Baird, noticed in the 'Proceedings of the Academy of Natural Sciences' for 1858, p. 255, which agrees with it in many particulars, but is certainly distinct, though probably belonging to the same family, *Xantusiidæ*, which may be characterized by the form of the tongue, the front fold on the throat uniting the ears, and the absence of the eyelids.

Professor Baird describes the pupil of *Xantusia* as vertical; in our genus it is circular.

This similarity to *Xantusia* makes it probable that this genus is from Lower California.

M. Auguste Duméril, in the 'Revue et Magasin de Zoologie' for 1852, describes and figures a new genus of Saurian under the name of *Lepidophyma flavimaculata* (t. 17), from the province of Peten in Central America, which resembles this Lizard in many particulars; but he particularly says that it has no femoral pores, which he says are found in all the *Zonures* with which he has compared it.

M. Duméril's genus is probably the same as the *Xantusia* of Baird; but cannot be the same as the one here described, which is peculiar, not only from having large femoral pores, but pores on the ventral shield as well.

Mr. E. Blyth exhibited some horns and other specimens which had been obligingly lent him for that purpose by the authorities of the South Kensington Museum.

Among them were a pair of loose horns and odd right and left horns (of different individuals) of a species of Deer that had been presented to Her Majesty by the Siamese Embassy lately in London, and made over to the South Kensington Museum by Her Majesty's command. (See figs., next page.)

The last were considered by Mr. Blyth to indicate the existence of an undescribed species of Deer, probably inhabiting Siam, which he denominated *Cervus* or *Rucervus schomburgki*, in compliment to his distinguished friend, Her Majesty's representative at the court of Bangkok. He had seen a similar pair of horns upon the frontlet, in Calcutta, in the possession of a sailor, who was unable to inform him of their origin; but Mr. Blyth had considered that pair, at the time, to represent a remarkable variety of horn of the *Rucervus duvaucelii* of India. The occurrence, however, of horns of three additional individuals of the same type, and the region from which they were all but certainly brought, induced him to believe that they indicated a veritable species, separated in its geographic range from that of *R. duvaucelii* by the intervention of the range of *Panolia eldi*. The latter extended from the Munipur Valley to that of the Irawádi (the species being common in Lower Pegu), and reappeared in the southern Tenasserim province of Mergui, and in that of Keddá within Siamese territory, a region where the *R. duvaucelii* or Indian Bárá Singhá was quite unknown. The horn of *R. schomburgki* much resembled that of the Bárá Singhá, but was remarkable for the extreme shortness of the beam, combined with a well-developed crown- and brow-antler, imparting a characteristic aspect. Had it not been for his extreme familiarity with the varieties of horns presented by the various Deer of India and neighbouring countries, Mr. Blyth would scarcely have ventured to consider the *Rucervus schomburgki* as distinct from *R. duvaucelii* of India, but under the circumstances he did not hesitate in regarding it as a second species of the same peculiar type.

A singularly contorted horn of a domestic Buffalo, also from Siam, was exhibited, gyring round much in the manner of an ordinary



Helix-shell, with the spires in absolute contact; and, from the same country, the anterior and posterior horns of different individuals of *Rhinoceros sumatranus*, which Mr. Blyth considered to be identical with the *Rh. crossii* of Dr. Gray (figured in P. Z. S. 1854, p. 250). Dr. Gray's specimen in the British Museum, according to Mr. Blyth, measures but 16 inches (not 24 inches) in span from base to tip,

and was certainly referable to *Rh. sumatranus*. Mr. Bartlett possessed a posterior horn of the same species, received with various Dyak weapons, &c., from Borneo, where the species would exist together with *Rh. sondaicus* (*v. javanicus*); and Mr. Blyth had been apprised of a two-horned Rhinoceros having also been killed in Asám, where it was considered a great rarity. He had elsewhere shown (Journ. As. Soc. 1861, p. 151) that both *Rh. sondaicus* and *Rh. sumatranus* inhabit the Indo-Chinese region and Malayan peninsula, and that, so far as he could learn, they were the only Rhinoceroses of that great range of territory, as *Rh. sondaicus* (and not *Rh. indicus*) was the only known species inhabiting the eastern Sundarbans of Bengal.

Mr. Blyth next called the attention of the Meeting to a frontlet with horns of a peculiar species of Buffalo, supposed to be from Africa, but the origin of which was unknown. The specimen had long been hung up in the Museum of King's College, where it bore his MS. name *planiceros*, imposed nearly a quarter of a century ago. This specimen he was permitted to exhibit through the kindness of Professor Rymer Jones. A second and much younger example of the same species had long been exhibited in the Museum of the Royal College of Surgeons, in the catalogue of which it had been assigned to the Gayál (*Bos frontalis*) of the Transbrahmaputran regions*, to which species it was not even specifically allied—it being unquestionably the frontlet of a veritable Buffalo, and of the African type, as distinguished from the Asiatic, as exemplified by *Bubalus caffer* and *B. brachyceros*.

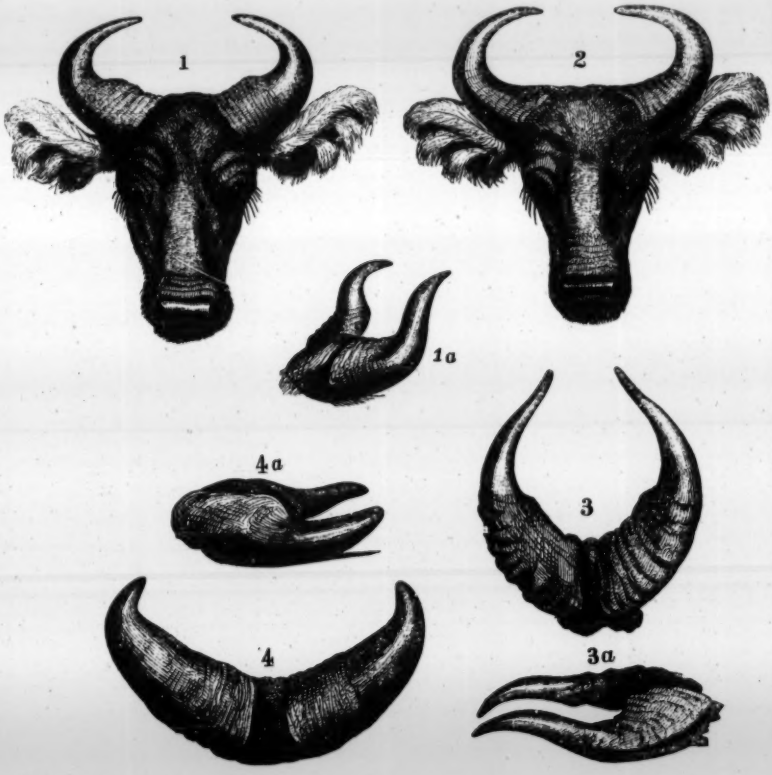
Another frontlet, indicative of an undescribed species of presumably African Buffalo (indeed, stated to be from South Africa, which must now be considered doubtful) had long been in the Collection of the British Museum, where it is assigned in Dr. Gray's Catalogue of the Mammalia in that collection to *B. caffer*, juv.†; but it has the indisputable characters of maturity, and is very unlike the young of *B. caffer* of either sex, with the development of the horns of which species Mr. Blyth was acquainted from personal observation in the case of the living male. This second species he proposed to designate *B. reclinis*.

The figures exhibited (see woodcuts, next page), drawn on a scale of an inch to a foot (English measure), would impart a better idea than any description of the horns of *Bubalus brachyceros*, Gray, *B. reclinis*, and *B. planiceros*.

The two heads of *B. brachyceros* have been drawn from a pair of specimens in the National Collection, brought to England by the celebrated traveller Capt. Clapperton, from Bornou; the faces and ears having been rectified from a living cow formerly in the Surrey Zoological Gardens, upon which Dr. Gray had founded the species.

* 'Catalogue of the Contents of the Museum of the Royal College of Surgeons, London,' pt. 3. p. 156, No. 1079. "The frontlet and horns of the Gyall."

† It is figured in the 'Catalogue of the Specimens of Mammalia in the Collection of the British Museum' (1852), pt. 3. *Ungulata furcipeda*, tab. 2. fig. 3. "Pennant's specimen." *Vide* Grew, Rar. 26; Pennant's Syn. Br. Mus. Catal. (1862), p. 227, *Bubalus caffer*, "*a.* Frontal bone and horns; young."



Figs. 1, 1*a*, and 2 represent the sexes of *B. brachyceros*; figs. 3 and 3*a*, the *B. reclinis*; and figs. 4 and 4*a*, the *B. planiceros*.

May 12, 1863.

E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

A communication was read from Messrs. Joshua Alder and Albany Hancock, F.Z.S., entitled "Notice of a collection of Nudibranchiate

Mollusca made in India by Walter Elliot, Esq., with descriptions of several new genera and species"*.

Mr. Leadbeater exhibited some castings thrown up by a species of Bee-eater (*Merops persicus*), similar to those usually produced by the King-fishers (*Alcedinidæ*).

Mr. Holdsworth exhibited living examples of *Lissotriton palmatus* obtained by himself from a new locality near Hereford, and made some remarks on this and three other species of Newts of which living examples were contained in the Society's Collection.

Mr. Blyth exhibited and made remarks on some specimens of two Rollers (*Coracias indica* and *C. affinis*), and of some intermediate varieties between these two species.

Mr. Louis Fraser laid before the Meeting the following list of Birds which had been captured or observed in the Society's Gardens in the Regent's Park, for the most part by Mr. E. Bartlett, son of the Superintendent, a very promising young naturalist:—

Kestrel	*Tinnunculus alaudarius*, Briss.
Barn-Owl	*Strix flammea*, Linn.
*Spotted Flycatcher	*Muscicapa grisola*, Linn.
Missel-Thrush	*Turdus viscivorus*, Linn.
Fieldfare	—— *pilaris*, Linn.
*Song-Thrush	—— *musicus*, Linn.
Redwing	—— *iliacus*, Linn.
*Blackbird	—— *merula*, Linn.
Ring-Ouzel	—— *torquatus*, Linn.
*Hedge Accentor	*Accentor modularis*.
*Redbreast	*Erithacus rubecula* (Lath.).
Wheat-ear	*Saxicola œnanthe*, Bechst.
*Reed Warbler	*Calamoherpe palustris*, Gould.
Sedge Warbler	*Calamodyta phragmitis*, Selby.
Nightingale	*Philomela luscinia* (Linn.).
*Blackcap	*Sylvia atricapilla*, Bechst.
Garden Warbler	—— *hortensis* (Gmel.).
Common Whitethroat	—— *cinerea*, Bechst.
Lesser Whitethroat	—— *garrula*, Bechst.
Wood Warbler	*Phyllopneuste sibilatrix*, Bechst.
Willow Warbler	—— *trochilus*, Gmel.
Chiff-chaff	—— *rufa*, Lath.
Golden-crested Regulus	*Regulus vulgaris*, Cuv.
Great Tit	*Parus major*, Linn.
Blue Tit	—— *cæruleus*, Linn.
Cole Tit	—— *ater*, Linn.
Marsh Tit	—— *palustris*, Linn.
Long-tailed Tit	—— *caudatus*, Linn.
Pied Wagtail	*Motacilla yarrellii*, Gould.

* This paper will be published in the Society's 'Transactions,' accompanied by six plates.

Grey Wagtail	*Motacilla boarula*, Lath.
Ray's Wagtail	—— *rayi*.
Tree Pipit	*Anthus arboreus*, Bechst.
Meadow Pipit	—— *pratensis* (Linn.).
Skylark	*Alauda arvensis*, Linn.
Common Bunting	*Emberiza milaria*, Linn.
Chaffinch	*Fringilla cœlebs*, Linn.
House Sparrow	*Passer domesticus* (Linn.).
Greenfinch	*Ligurinus chloris* (Linn.).
Hawfinch	*Coccothraustes vulgaris*, Briss.
Goldfinch	*Carduelis elegans*, Steph.
Common Linnet	*Ægiothus linarius* (Linn.).
Lesser Redpole	—— *minor* (Ray).
Bullfinch	*Pyrrhula vulgaris*, Briss.
Starling	*Sturnus vulgaris*, Linn.
Carrion Crow	*Corvus corone*, Linn.
Rook	—— *frugilegus*, Linn.
Jackdaw	—— *monedula*, Linn.
Great Spotted Woodpecker	*Picus major*, Linn.
Common Creeper	*Certhia familiaris*, Linn.
Wren	*Troglodytes parvulus*.
*Swallow	*Hirundo rustica*, Linn.
Martin	—— *urbica*, Linn.
Swift	*Cypselus murarius*, Temm.
Nightjar	*Caprimulgus europæus*, Linn.
Wild Duck	*Anas boschas*, Linn.
Moorhen	*Gallinula chloropus* (Linn.).
Coot	*Fulica atra*, Linn.

The species marked thus * had been observed to breed in the Society's Gardens.

The following papers were read:—

1. On the Mammals and Birds collected in Madagascar by Dr. Charles Meller. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

Dr. Charles Meller, who went up with the Mission from Mauritius to Antananarivo† last year, as Medical Attendant, collected about seventy skins of Mammals and Birds on the road between Tamatave and the capital. At the suggestion of our Corresponding Member Mr. Edward Newton, Dr. Meller has since forwarded these to me, along with botanical specimens sent to the herbarium at Kew. I have therefore done my best to determine the species in this collection; and, with the assistance of Dr. Hartlaub's book on the 'Birds of Madagascar' and Mr. Alfred Newton's personal aid, I believe I have performed this with tolerable exactitude.

Paper labels were attached to most of the specimens. The information contained on these I have given as far as the words were legible.

† See Linnean Society's Journal, Bot. vol. vii. p. 57, for an account of this expedition.

The collection only embraces two species of Mammals, namely:—

1. Hapalolemur griseus (G. St. Hilaire).

Lemur griseus, G. St. Hil.—*Lepilemur griseus*, Is. Geoff. St. Hil. Cat. des Prim. p. 75.—*Chirogaleus griseus*, Giebel, Säug. p. 1018.

Mr. Meller's collection contains two examples of a *Lemur*, which I refer to this species, from the "Bamboo-forests near Alamazaotra." They are an adult female and a young one, taken at the same time. There is no doubt about this animal belonging to the genus called *Hapalemur* by Geoffroy St. Hilaire, the peculiarities of its dentition and short hairy ears rendering it easily recognizable. As regards coloration, it appears to agree best with St. Hilaire's new species *Hapalemur olivaceus*; but whether this be in reality anything more than a variety of *H. griseus* seems doubtful. Without comparison of specimens it would be impossible to pronounce upon this subject; and I am not aware that there are any examples of these animals in the country, this form of *Lemuridæ* being at present unrepresented even on the well-stored shelves of our national collection.

Dr. Meller's adult female example measures, along the back, about 14½ inches from the snout to the root of the tail; the tail is 15 inches in length. The fur is of a greyish mouse-colour, finely striated throughout, overspread with yellowish rufous on the upper parts, particularly on the crown of the head and back; below paler, nearly pure pale cinereous, with the belly and inner sides of the limbs somewhat ochraceous. The younger individual is scarcely different, except in being rather more yellowish below.

2. Centetes ecaudatus (Schreb.).

Native name, *Tandrack*. Obtained at Beforona.

Rather darker and smaller in size than most of the specimens in the British Museum (which are from Mauritius), but hardly otherwise different. Mr. Flower, who has kindly compared the skull of this specimen with others of *Centetes* in the collection of the Royal College of Surgeons, informs me that it only differs in being smaller. The importation of this animal into Mauritius, if this has really taken place, as is generally stated, may have resulted in an increase of size and variation into a paler coloration.

The birds in Dr. Meller's collection are of forty species, nearly the whole of which are correctly registered in Dr. Hartlaub's work. They are as follows:—

Aves.

1. Tinnunculus newtoni, Gurney, Ibis, 1863, p. 34, pl. 2.—*Tinn. punctatus*, ex Madagascar, Hartl. *l. c.* p. 18.

Two examples from Nossibey and River Hivondro.

2. Polyboroides radiatus (Scop.), Hartl. *l. c.* p. 21.

Native name, "*Vorondoui*." Obtained "July 1862, near the river at Beforona."

All the names of the older authors often applied to the continental form of this bird belong in strictness to this Madagascar species. The synonymy of the two birds should stand as follows:—

(1.) POLYBOROIDES RADIATUS. (*Supra pallidior: fasciis abdominis latioribus.*)

L'Autour à ventre rayé de Madagascar, Sonn. Voy. pl. 103.
Vultur radiatus, Scop. Del. pt. 2. p. 85.
Falco madagascariensis, Daud. Tr. d'Orn. ii. p. 78.
Falco gymnogenys, Temm. Pl. Col. 307.
Sparvius madagascariensis, Vieill. Nouv. Dict. x. p. 339.
Polyboroides radiatus, Hartl. *l. c.* p. 21, et Enc. Méth. p. 1271.
Polyboroides madagascariensis, A. & E. Newt. Ibis, 1862, p. 268.
Gymnogenys malzacii, Verr. Rev. et Mag. de Zool. 1855, p. 348.
Hab. In Madagascariensi ins.

(2.) POLYBOROIDES TYPICUS. (*Supra magis obscurus: fasciis abdominis angustioribus.*)

Polyboroides typicus, Smith, S. Afr. Quart. Journ. i. p. 107; Rüpp. Syst. Ueb. p. 12.
Polyboroides capensis, Smith, S. Afr. Journ.
Polyboroides radiatus, Gurney, Ibis, 1860, p. 237; 1862, p. 35.
Hab. In Africa universâ præter Septentr.

3. MILVUS PARASITICUS (Daud.), Hartl. *l. c.* p. 19.

Native name, *Peroruva*. "Iris bright sienna, and light brown dirty feet." Seen from Tamatave to Fenerive.

4. OTUS MADAGASCARIENSIS, A. Smith, S. Afr. Quart. Journ. ii. p. 316; Hartl. *l. c.* p. 23.

Obtained in August 1862, at Vavony. "Iris black."

5. STRIX FLAMMEA, Linn.; Hartl. *l. c.* p. 24.

Native name, *Para*. "Lives in the rocks of Antananarivo: comes out about 4 P.M."

6. CORYTHORNIS VINTSIOIDES (Lafr.), Hartl. *l. c.* p. 31.

Native name, *Vinshi*; frequents the lakes, rivers, &c.

7. NECTARINIA ANGLADIANA, Shaw; Hartl. *l. c.* p. 52.

Native name, *Sushné*.

8. NECTARINIA SOUIMANGA (Gm.), Hartl. *l. c.* p. 34.

"Iris pink: found both in the forests and on the plains."

9. DRYMŒCA MADAGASCARIENSIS, Hartl. *l. c.* p. 53.

"Iris brown: found on the plains."

10. ELLISIA TYPICA, Hartl. *l. c.* p. 37.

"*Amanzarik*: iris brown."

11. Pratincola sibylla (Linn.), Hartl. *l. c.* p. 38.

Several examples of this apparently common Madagascar bird from the "valleys and hills to within twenty miles of Antananarivo." "Iris dark brown."

12. Gervaisia albospecularis (Eyd. & Gerv.), Hartl. *l. c.* p. 39.

One example, without label attached.

13. Motacilla flaviventris, J. Verr.; Hartl. *l. c.* p. 39.

"Wagtail; native name, *Skulula*: obtained at Andovorant, 27th Aug. 1862. Iris pink sienna."

14. Zosterops madagascariensis (Linn.), Hartl. *l. c.* p. 40.

"Native name, *Shei*. Iris pinkish brown: from the forests."

15. Hypsipetes ourovang (Gm.), Hartl. *l. c.* p. 44.

"Native name, *Vorova*: iris dark brown: common on the road from Andovorant to Mandrahody."

16. Tchitrea mutata, (L.), Pl. Enl. 248. fig. 2; Hartl. *l. c.* p. 45.

"Native name, *Sicatri*: found by the streams: iris brown."

17. Tchitrea ——?

"Native name, *Selangani*: iris sienna: obtained at Beforona, 31st July, 1862."

Probably the chestnut form of the preceding.

18. Dicrurus forficatus (Linn.), Hartl. *l. c.* p. 49.

Two examples. Native name, *Drongne*: iris pinkish brown: obtained in the plains by the village of Andranakoditra, but "common all along the road."

19. Vanga curvirostris (Linn.), Hartl. *l. c.* p. 51.

"Native name, *Vorombanga*: iris light brown: from the beach at Andovorant."

Mr. F. Plant, who is now collecting objects of natural history in Madagascar, has lately transmitted to Mr. Stevens a nest and two eggs of this bird. The nest is an open cup-shaped structure, composed of small sticks, roots, and fibres, lined with rather finer materials of the same description. The interior is about 2½ inches in diameter, the whole mass measuring 7 inches in diameter. The eggs are white, spotted with two shades of red, and measure 1·2 by 0·8 inch.

20. Hartlaubia madagascariensis (Linn.), Hartl. *l. c.* p. 52.

Native name, *Fetat*: iris dark brown: Andovorant.

21. Spermestes nana, Puch.; Hartl. *l. c.* p. 56.

Three examples without labels.

22. MIRAFRA HOVA, Hartl. *l. c.* p. 57.

Native name, *Suréte*, or *Shurete*: found in the plains; a fast-running Lark. Two examples, obtained at Ambatananga and Maromango. "Iris pinkish sienna."

23. CORACOPSIS VASA, Bp.; Hartl. *l. c.* p. 58.

Native name, *Boisa*: obtained at Beforona and Analamazotra.

24. CORACOPSIS NIGRA (Linn.), Hartl. *l. c.* p. 58.

Iris dark brown: from Andovorant: native name, *Boisa*.

25. CENTROPUS TOLU (Linn.), Hartl. p. 60.

Four examples of this apparently common bird, from between Hivondro and the capital, obtained in July and August. Native name, *Tooloohoo*: iris sienna-brown.

26. COUA CÆRULEA, Linn.; Hartl. *l. c.* p. 60.

Two examples. Native name, *Tesin*, or *Tisin*: one from the "woods near Beforona," and the other "from the woods of Analamazotra: iris in each example marked "dark brown."

27. FUNINGUS MADAGASCARIENSIS (Linn.), Hartl. *l. c.* p. 64.

Native name, *Founi*: iris pink, caruncle pink: from the "hills by Beforona," and from the woods by Analamazotra.

28. VINAGO AUSTRALIS (Linn.), Hartl. *l. c.* p. 65.

Native name, *Vounenigo*, or *Founi*: iris pink: from the hills by Ranomaton (July 29, 1862).

29. TURTUR PICTURATUS (Temm.), Hartl. *l. c.* p. 66.

One example without label.

30. MARGAROPERDIX STRIATA (Gm.), Hartl. *l. c.* p. 70.

Native name, *Trou-trou*: iris dark brown; legs dark brown: found in the "grassy hills; flight low and short."

31. CHARADRIUS TENELLUS, Hartl. *l. c.* p. 72.

One example, not in good state, obtained on the beach: "iris light brown."

32. ARDEA ATRICAPILLA (Afz.), Hartl. *l. c.* p. 75.

One example without label.

33. ARDEA BUBULCUS, Sav.; Hartl. *l. c.* p. 74.

Native name, *Vorompotsi*, or *Vorompootsa*: iris bright yellow: obtained at Andovorant, 26th July, 1862.

34. SCOPUS UMBRETTA (Linn.), Hartl. *l. c.* p. 76.

Obtained in the paddy-fields at Moromanga: iris brown.

35. ROUGETIUS BERNIERI, Bp.; Hartl. *l. c.* p. 80.

"Waterhen: native name, *Skosa*: shot in the highest part of the wood near Analamazotra. Iris pink."

36. PORPHYRIO MADAGASCARIENSIS (Gm.), Hartl. *l. c.* p. 81.

"Green Waterhen, from Lake Hivondro."

37. GALLINULA PYRRHORHOA, Newton, P. Z. S. 1861, p. 19.—*G. chloropus*, Hartl. *l. c.* p. 81.

One example without label.

38. NETTAPUS AURITUS (Bodd.), Hartl. *l. c.* p. 82.

Several examples of this little Goose, from Lake Hivondro. "Iris brown."

39. DAFILA ERYTHRORHYNCHA (Gm.), Hartl. *l. c.* p. 82.

Two examples from the marshes near Analamazotra: iris sienna-brown. Native name, *Harki*.

40. PODICEPS PELZELNI, Hartl. *l. c.* p. 83.

"*Voron-koki*: iris dark brown: from the marshes and rivulets by Beforona."

2. CHARACTERS OF A NEW SPECIES OF SEDGE WARBLER FROM MADAGASCAR. BY DR. G. HARTLAUB.

CALAMOHERPE NEWTONI, nob.

♂. *Supra obscurius olivacea, subunicolor, subtus multo pallidior, medio subflavicans; mento gulaque albidis; jugulo maculis longitudinalibus fuscis conspicue notato; subalaribus flavo-albidis; subcaudalibus obscuris; maxilla fusca, mandibula obscure aurantiaco-rubente; ore interno læte aurantiaco; iride helvola; ala brevi; cauda longa, rotundata, rectricibus angustatis, apice rotundato-attenuatis.*

Long. $6\frac{1}{3}''$; rostr. a fr. $6\frac{1}{4}'''$; rostr. a rict. $9'''$; al. $2''\ 7'''$; caud. $3''$; tars. $11'''$.

Two male specimens of this unquestionably new species were collected by Mr. Edw. Newton near Soamandrikazay, in the island of Madagascar.

3. ON SOME INSECTS COLLECTED IN MADAGASCAR BY MR. J. CALDWELL. BY F. WALKER, ESQ.

The insect-fauna of Madagascar is to a great extent almost unknown; but enough has been ascertained to show that it contains several peculiar forms, though some of its species are identical with those of South Africa, and others with those of Hindostan. Various

Coleoptera have been discovered and described by French naturalists; and Boisduval, in his 'Faune Entomologique de Madagascar, Bourbon et Maurice,' has characterized the more conspicuous Lepidoptera; Bigot has described several Diptera; and Coquerel has ascertained the habits of a few species of other insect classes. While expecting the arrival of large collections of insects from this island, I have availed myself of the kindness of Dr. Sclater to give a brief notice of some species collected by J. Caldwell, Esq., near Antananarivo, the capital of Madagascar.

Coleoptera.

Cybister. Two or three species of this genus.

Polybothris auropicta.

This is one of the species of *Buprestidæ*, with dilated elytra, which are peculiar to Madagascar.

Apoderus. A large and handsome species.

Orthoptera.

Acheta. One species.

Œdipoda. One species.

Phymatius morbillosus.

Mantis. One species.

Neuroptera.

Æschna. One species.

Libellula. Two species.

Hymenoptera.

Xylocopa æstuans.

This also inhabits Hindustan and the islands of Sumatra, Celebes, and Aru.

Hemiptera.

Lygæus consentaneus, n. s.

Diplonychus. One species.

Notonecta. One species.

Belostoma. One species.

Lepidoptera.

Acherontia atropos.

Madagascar and the two neighbouring isles seem to be the central habitation of this species, whence it extends on the one hand along the coasts of Africa and of West Asia and through Europe, and on

the other hand to Hindostan, China, Java, and the Philippine Isles. Of the other two supposed species of this genus, *A. styx* (called also *A. medusa*) seems to be an Asiatic form of *A. atropos*; and the latter can hardly be considered as originally distinct from the third species, which inhabits Hindostan, Ceylon, China, and Java, and has received the names of *mortis*, *satanas*, *lethe*, and *circe*. The introduction of *A. atropos* into England may be a consequence of the warmer period which ensued after the glacial epoch, and during which the southern forms of life migrated northward. This period is indicated slightly in the present time, when a hot summer in England is accompanied by the appearance of some South European insects.

Euchromia folletii, Guér.

Bizone amatura, n. s.

The genus *Bizone* has been hitherto only discovered in Asia and in some of the Eastern Islands.

Artaxa fervida, n. s.

Euproctis producta, n. s.

Trigonodes hippasia.

Inhabits also Ceylon and Hindostan.

Arachnida.

Gasteracanthus. One species.

The new species indicated above may be described as follows:—

Lygæus consentaneus.

Coccineus; proboscide, antennis, pedibus, prothoracis punctis duobus, mesothorace, metathorace, abdominis maculis lateralibus maculaque apicali, necnon alarum anticarum lineola costuli, puncto discali membranaque nigris; alis posticis nigricanticinereis, venis nigris, ad basin rufis.

Bright red; proboscis, antennæ, and legs black; prothorax with two black points in a transverse line on the disk; mesothorax and metathorax black: abdomen with black dots along each side; apical spot black, largest on the underside: fore wings with a short black costal line and a black discal point, membranous part black: hind wings blackish cinereous; veins black, red towards the base. Length of the body 6 lines, of the wings 12 lines.

Bizone amatura.

Fœm. *Alba, palpis antennisque roseis, pedibus roseo variis; alis anticis linea exteriore subinterrupta, strigis quatuor costalibus maculisque septem marginalibus roseis, alis posticis guttis marginalibus roseis minus determinatis.*

Female. White; palpi and antennæ rosy; fore legs rosy; middle tibiæ with two rosy bands; posterior tarsi rosy; fore wings with an

exterior transverse, slightly interrupted, rosy line, with four rosy streaks along the costa, and with seven rosy spots along the exterior border; hind wings with less distinct rosy dots along the exterior border. Length of the body 4½ lines, of the wings 11 lines.

ARTAXA FERVIDA.

Mas. *Ochracea, capite thoraceque hirsutis; alis anticis lineis duabus transversis undulatis albidis, secunda extus ochraceo saturatiore marginata.*

Male. Ochraceous; head and thorax with erect hairs; fore legs very densely pilose; anterior tibiæ fringed towards the base; fore wings with two irregular undulating transverse whitish lines, second line bordered irregularly with darker ochraceous on the outer side. Length of the body 5 lines, of the wings 14 lines.

EUPROCTIS PRODUCTA.

Mas. *Nivea, abdominis fasciculo apicali ochraceo; alis anticis elongatis, apice rotundatis.*

Male. Pure white; abdomen with a bright ochraceous apical tuft; fore wings elongated, rounded at the tips; costa and exterior border hardly convex, the latter very oblique. Length of the body 8 lines, of the wings 20 lines.

The ochraceous apical tuft of this species distinguishes it from *E. divisa*.

4. On a New Species of Calliste from Costa Rica. By Osbert Salvin, M.A., F.Z.S.

CALLISTE DOWII, sp. nov.

Supra nigra: dorso vix viridi lavato, plumis nuchæ et laterum colli utrinque argentescente viridi terminatis, pilei margine postico ochracescente marginato: uropygio argentescente viridi, tectricibus superioribus rectricum cyaneis: subtus gula tota nigra: pectore superiore nigro, plumis viridescenti-cinnamomeo terminatis: ventre imo cum crisso et lateribus cinnamomeis, pectore inferiore paulo dilutiore: primariis usque ad terminos, secundariis, tectricibus alarum et rectricibus omnino nigris, pogoniis externis omnium cyaneo marginatis, tectricibus subalaribus albis, vix cinnamomeis; campterio cyaneo, albo vittato: rostro nigro, mandibulæ inferioris basi albida: pedibus flavo-nigris.

Long. tot. 5·25, alæ 2·9, caudæ 2, tarsi ·75, poll. angl.

Hab. Costa Rica.

This is a very distinct species, and unlike any of the genus. The greenish-silvery feathers of the neck and the green uropygium suggest the group which Dr. Sclater unites under the head of *Procnopis*, as its proper position in the genus, its nearest ally being the New Granadian *C. nigriviridis*, from which, however, it differs essentially.

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J. Wolf, del. et lith.

M & N Hanhart, imp.

ORYAS DERBIANUS.

This makes six species of *Calliste* now known to inhabit Central America and the Isthmus of Panama, viz. *C. larvata* from the hot forest-region of the Atlantic side of Guatemala, *C. francescæ** from Costa Rica and Veragua, *C. dowii* from Costa Rica, *C. frantzii* from the same country, *C. gyroloides*, a species ranging from Costa Rica to Bolivia, and *C. inornata* from Panama to the Isthmus of Darien.

The single specimen of this *Calliste* now described was procured by Capt. J. M Dow, Corr. Mem. Z.S., at San José, the capital of Costa Rica, during a short visit he paid to that city in the early part of the present year, and by him most kindly presented to me. He was unable to inform me exactly whence it came; but it was most probably obtained from the low forest-region of the Atlantic slope.

I dedicate the species to Capt. Dow, whose researches in the marine fauna of Central America are too well known for me to need to dilate upon the justice of the appellation.

5. Notes on the Derbyan Eland, the African Elephant, and the Gorilla. By W. Winwood Reade, F.S.A.L.

(Plate XXII.)

1. The Derbyan Eland (*Oreas derbianus*, Gray).

When I was on the Casamanza, a river of Senegambia, in December 1862, I was informed of the existence of an enormous Antelope, double the size of the Senegal Bullock, with horns lying backwards, a black mane, and white stripes on its sides. My French host informed me that it was unknown in France, which is quite true, as, in fact, its very existence has been denied by French naturalists. I asked where this animal was most abundant, and was told in the bamboo-forest of Bambunda, about fifty miles north-east of Sedhu, where I was staying. I immediately rode over to a village called Missera, situated on the borders of the forest, taking a rifle with me. The hunters of that village told me that at that time it would be impossible to kill the *Djik-i-junka*, the bush being dark, as they expressed it; but that in a few weeks they would burn the tangled undergrowth of the forest and the high grass of the plains, according to their annual custom. They would then have a *battue*; hundreds of people would collect, and animated nature, towards the close of the day, would be driven into a large plain. There Antelopes, Gazelles, Wild Boars, Porcupines, &c., would be found so exhausted that many of them could be killed with sticks; and indeed only a limited number

* I had considerable doubts whether this species was really separable from *C. larvata*, but, having examined a number of skins of both species, have come to the conclusion that the distinction, small as it is, is constant. Dr. Sclater has pointed out in his 'Monograph' what the differences are, to which I may add that *C. francescæ* seems a lighter rather than a brighter bird than *C. larvata*; the blue on the forehead is a trifle broader in the former; and the outer bluish-green margin to the middle wing-coverts of the latter is almost obsolete in the former. In fact, there is just a difference, and that is all.

of guns were allowed in case of accidents. Accordingly I made an arrangement with them that the first specimen they killed should be sent to Sedhu, where my friend M. Rapet would buy it for me, and send it on. Thus I obtained one specimen; the others I purchased at Macarthy's Island, Gambia.

I made inquiries of these hunters of Nussera as to the habits of the Derbyan Eland. They told me that the forest was its home; that it never of its own accord entered the plains; that it never grazed, but that the bull would tear down branches of trees for the does and fawns to feed upon.

A fawn, destined for le Jardin des Plantes, was once sent by M. Rapet from the Casamanza, but it died at Goree. When I was at Macarthy's Island, I saw a fawn of this Antelope which was in the possession of an officer of the 2nd West Indian Regiment; it was extremely tame, allowing itself to be caressed, and was so young that it used to be fed on milk.

2. The African Elephant (*Elephas africanus*).

The most wonderful sight which I saw in Africa (at least in a zoological point of view) was an Elephant-nghâl, or enclosure. I had just returned to the Gaboon settlements after a trip among the Fans, when I heard that a hunting-party of these cannibals had enclosed three Elephants in a nghâl, or fence. I immediately went off in my canoe, and slept that night at a village within a few miles of the place. I walked over there the next morning. About twenty acres of ground had been enclosed by what is called, in hunting parlance, posts and railings. Round this fence at intervals were the huts of the hunters. After I had paid the usual compliments to the chief, and also the price of my admission to the menagerie with a few strings of white beads, I said that I should like to see the Elephants. The chief answered that the Elephants were asleep under a large tree, which he pointed out to me. I wanted to crawl in and have a look at them; but they would not let me do that, fearing that a white face would frighten the Elephants away, in which case (so my interpreters informed me) I should be kept prisoner till I had paid the value of the meat and the ivory. But they told me to have patience; for the Elephants would wake up in the afternoon. Presently a number of young men came running round, and took me to a place where I could see one of the Elephants, a fine tusker, about 100 yards off. He was swinging himself on three legs and feeding, sometimes helping himself to the leaves of the tree with his trunk.

I asked how the Elephants were got into this fence and kept there. The Fans replied that, having found that three Elephants frequented that part of the forest (for these animals are not found in large herds here as in South Africa), they had built the fence—which certainly must have occupied them a considerable time. They left a gap (which they had not even closed up, for they showed it me), and their medicine-man made fetish for them to come in; they came in; then he made fetish for them to stay, and they stayed. When the new moon appeared, *i. e.* in about a fortnight's time, they would kill

them; and then he would make fetish that they should not be angry.

Now, if I had read this in a book, I should have disbelieved it. The Elephant, which is so intelligent, to be decoyed into so palpable a trap! the Elephant, which is so sensitive of the approach of man, to remain for days and days surrounded by the hubbub of a negroes' camp! what can appear more absurd?

But as the Elephant was there before my eyes, I was under the painful necessity of believing a thing which I did not understand, which of course I found very humiliating. A little while afterwards a man came round singing and dabbing the fence with a piece of rag soaked in a dark brown liquid. The Fans then told me that they made fetish every day, and that this fetish would be spoilt if a white man was present. I took this delicate hint and went away. Now I think that I can offer an explanation of this, which, if not perfectly satisfactory, is not unreasonable. The doctors, or fetish-men, as we call them, of the negroes have certainly an intimate knowledge of herbs. Possibly, by observing the habits of Elephants, they have found out some herb with which they can entice them where they please. This would be the fetish which made them come in. They would probably use another herb, which the Elephants disliked, to prevent them going out; and perhaps this was the dark brown liquid which they sprinkled on the fence. Finally, they might scatter stupifying herbs among their food; and this would be the fetish which prevented them from being angry whilst they were being killed. This surmise was afterwards partly indorsed, when I was in Angola, by a runaway slave from the unvisited kingdom of Matiamvo, who told me that they always poisoned the Elephants there before attempting to kill them. Before the Elephants in question were killed, all the undergrowth was cut down, part of which I saw had already been done; and they were killed with cross-bows, spears, and trade-guns.

3. The Gorilla Ape (*Troglodytes gorilla*).

I will now speak of that *Troglodytes prodigiosus*, the Gorilla.

In the first place, the name itself is a blunder. The *Gorillæ* of Hanno were found, it is supposed, on Sherbro Island; they scaled rocks, and they defended themselves with stones. These could neither have been Gorillas nor Chimpanzees, but a species of *Cynocephalus*, or kind of Baboon, commonly called the Dog-faced Monkey. These animals, which I have seen often enough in Senegambia, go in troops, which Gorillas do not, and actually defend themselves with stones,—a fact which I assert not only on the evidence of natives, but on the evidence of white men who have kept them in a state of captivity. They are also very ferocious, and will always defend themselves when attacked either by man or by beast.

I spent five months in the Gorilla country, and did not leave that part of Africa till I had completely satisfied myself respecting the habits of this animal. The evidence which I now lay before you is composed of statements made to me by men who had killed Gorillas. It is collected from three distinct parts of Equatorial Africa, viz.

from the Balengi of the Muni River, from the Shekani and Fans of the Gaboon, and from the Commi, Bakeli, &c., of the Fernand Vaz. But from the last river, where Gorillas are most plentiful, I obtained most information.

The Gorilla is found in those thick and solitary places of the forest where animal life is scarce. His food is strictly vegetable. He moves along the ground on all fours; sometimes he goes up into the trees to feed on fruit, and at night he sleeps in a large tree. When the female is pregnant, the male builds a nest, where she is confined, and which she abandons as soon as her young one is born.

The Gorilla does not beat its breast like a drum. It utters a kind of short, sharp bark when enraged, and its ordinary cry is of a plaintive nature.

With respect to its ferocity, the hunters have a proverb, "Leave a *Nyina* alone, and it will leave you alone." When it is at bay and wounded, it will attack man, like the Stag, the Elephant, and other animals naturally timid. But it makes this attack on all fours; the hunters, who are themselves as nimble as apes, often escape from it as men escape from the charge of an Elephant. I have seen a man who had been wounded by a Gorilla; his wrist was crippled, and the marks of the teeth were visible. He told me that the Gorilla seized his wrist and dragged it into his mouth; it was contented with having done this, and went off. The nearest approach to an erect posture which the Gorilla attains to is by supporting itself by holding on to the branches. When I asked the people of Ngumbi whether a man had ever been killed by a Gorilla, they said that their fathers had spoken of such a thing, but that nothing of the kind had happened within the memory of anybody living.

Such is the evidence of the native hunters upon the habits of the Gorilla. I could not find that it differed in any important respect from the Chimpanzee, except in its superior size and strength, and in its being certainly more formidable when wounded. But when I asked the hunters which was the more dangerous, the Leopard or the Gorilla, they replied, "The Leopard."

I can make one or two positive assertions from my own experience. Although I never succeeded in seeing a Gorilla in its wild state, I can assert that it travels on all fours; for I have seen the tracks of its four feet, over and over again. I can assert that it runs away from man, for I have been near enough to hear one running away from me; and I can assert that the young Gorilla is as docile as the young Chimpanzee in a state of captivity, for I have seen both of them in a state of captivity. I have also seen the lying-in nests both of Chimpanzees and Gorillas, the latter being a little the larger of the two. The Chimpanzee, I may observe, has the character of being more intelligent than his big brother.

Now, Gentlemen, I hope you will permit me to add a few words in vindication of my own personal character. Whether M. Du Chaillu has killed a Gorilla or not is not, I think, of much scientific moment when compared with his real merits as an explorer, as an author on the ethnology of Equatorial Africa, and as a collecting naturalist.

But I have brought an accusation against M. Du Chaillu, and I should deserve to be severely blamed if I had brought a charge against any man on light and insufficient grounds.

Not having been able to find out at the Gaboon whether M. Du Chaillu had killed a Gorilla or not, nobody having visited the interior of the Fernand Vaz since he left it, I determined to go there, and made a tedious voyage by open boat and canoe from Gaboon to Ngumbi. On arriving at this town, pretending of course to be a trader, almost the first question I was asked was whether I would buy Gorillas, as M. Du Chaillu did. I refused to buy them, but said that I would give a large reward to any hunter who would get me a shot at one, and also a present to the king. They seemed astonished at this, and asked me why I wished to do a thing which other white men had not wished to do.

Now I had taken with me two interpreters, and managed to make them quarrel, so that there might be no collusion in the matter. I examined Etia, a hunter in whose company M. Du Chaillu professes to have killed Gorillas, by each interpreter separately. I examined in the same manner the five guides who had escorted him into the Apingi country; and though they spoke of M. Du Chaillu in high terms, and appeared to have a great affection for him, they all replied that he had never shot a Gorilla.

If I sit among a jury, and a man is placed in the witness-box and gives his evidence clearly, if he does not change his statements under a severe cross-examination, I admit, of course, the *possibility* of perjury, but if I can imagine no reason why he should perjure himself, I am forced to give a verdict according to that evidence. Such a case is the one in point. I say that it is possible M. Du Chaillu has been belied by these men, but I cannot admit that it is probable. In any case I think you will allow that he has not been belied by me, and that any other man would have arrived at the same conclusion on receiving similar evidence.

6. Observations on the Box Tortoises, with the Descriptions of Three New Asiatic Species. By Dr. J. E. Gray, F.R.S., etc.

The knowledge of the animals of our own country is progressive and only gradually acquired; and how much more so must it be as regards the species which we receive from a distant country, whence we get only isolated specimens, and often in a more or less imperfect condition, without any account of how they live, and what they eat, and in what manner they conduct themselves!

In such cases how can we do more than guess at what is a species, and into what groups the species should be divided? and yet, because we doubt in what we are doing (and the older we become in the study, the more do we see the necessity for doubting, and the more do we see the imperfection of our materials)—yet, on the doubts which arise from such causes and not from any want of faith in the principle that species are permanent, if we only had materials enough

to study them properly, do theorists wish to support the theory that species gradually pass into each other, and have been derived, or rather have originated, from such transformations. Never was a theory more baseless, as far as our knowledge is concerned.

This imperfection of our knowledge is specially the case with respect to exotic Tortoises, where we sometimes only procure the shell, at other times the animal with the shell in a more or less perfect condition; and when the latter is procured, we find that the conclusions that we had come to as regards the probable form of the animal, or some part of it, are more or less incorrect, and we are thus obliged to reconsider the situation the species occupies in the series.

Having lately received some more perfect specimens of some of the Indian Box Tortoises, I am induced to suggest their arrangement as follows:—

The Tortoises belong to the tribe *Cistudina*, are characterized by having the sternum attached to the back by a ligamentous suture on each side, and being divided across the centre by a similar cross suture, leaving the front and hind lobe more or less moveable.

In the *normal Cistudinæ*, which have the lobes of the sternum moveable at all ages, the cartilaginous sutures and the suture between the pectoral and ventral shields of the sternum are at the same situation; and the lobes of the sternum are broad, as broad as the opening of the thorax, and cover the legs when they are contracted.

The normal *Cistudinæ* may be divided into genera, according to the more or less aquatic habits of the animal, as indicated by the structure of the feet.

I. *Sternum-lobes unequal; front shorter, almost free from the symphysis. The hind foot slender, elongate; toes very unequal, second longest.* N. America.

1. Cistudo.

Thorax convex, solid; sternum rounded or truncated before and behind; the front lobe smaller, almost free from the symphysis. The fore legs with large shields in front; the toes short, enclosed, not webbed, with short conical claws. The hind feet elongate, narrow, with the second toes produced; the rest short, nearly enclosed, not webbed; the soles of the feet with subequal moderate-sized scales, the hinder edge rounded.

N. America.

* *The hind feet with small hinder or outer fourth toes.* Cistudo.

Cistudo carolina, Gray, Cat. Shield Rept. B.M. p. 39.

Of which *C. ornata* and *C. major*, Agassiz, seem to be varieties.

** *The hind feet without any small fourth toes.* Onychotria.

Cistudo mexicana, Gray, Cat. *l. c.* p. 40.

See also *C. triunguis*, Agassiz, which is said to be smaller than *C. carolina* and *C. mexicana*.

Dr. Holbrook describes and figures *Cistudo blandingii* (t. 3) as a separate species, because it has a head like *Emys*, the upper jaw deeply emarginate in front, the front lobe of the sternum less elevated. On these characters Lecomte refers it to *Lutremys*, and Agassiz to *Emys*, as restricted by Bonaparte, who regards *E. europæa* as the type. The figures of Holbrook look very like *Cistudo carolina*; but Agassiz, who forms for it a subfamily, describes it as much more depressed. It is probably distinct; but I have never seen an American Box Tortoise that could be arranged or confounded, as Leconte has done this, with our European *Lutremys*. It certainly is not *E. meleagris* of Shaw, as Agassiz believes.

II. *Sternum-lobes subequal, both forming part of the lateral symphysis.* The Old World.

i. *Hind foot elongate; toes very unequal, nearly free, second longest.*

2. PYXIDEA.

The thorax convex, solid. Sternum flat; lobes rather narrow, truncated in front, notched behind. Legs with large band-like thin shields in front; toes short, scarcely exserted, with band-like shields above, slightly webbed. The hind feet rather elongate; toes slightly webbed, short; the second rather elongate, produced, with a large claw. Claws conical, acute.

PYXIDEA MOUHOTII.

Cyclemys mouhotii, Gray, Ann. & Mag. N. H. 1862, x. p. 157.
Hab. Lao Mountains, Siam.
The back is flattish and sharply three-keeled.

ii. *The hind foot elephantine; toes subequal.*

3. CISTOCLEMMYS.

Thorax convex, solid. Sternum nearly flat, rounded before and behind; the front lobe large, partly enclosed in the symphysis. The fore feet subclavate; the toes very short, nearly enclosed, not webbed; the claws short, blunt. The hind feet elephantine, subcircular; toes very short, enclosed. Soles with two series of large prominent shields; the hinder edge keeled, but scarcely produced. Tail shielded beneath. Asiatic.

This genus, in the convex and solid structure of the thorax, is like *Cistudo*; but the foot is more like that of the Land-Tortoises; and the hind foot is subcylindrical, instead of elongate as in the American genus.

CISTOCLEMMYS FLAVOMARGINATA.

Dark brown, shields of the back deeply concentrically grooved; the sternum flat, black; the lower side of the margin of the thorax yellow; head olive, temple yellow, with a yellow streak on each side of the crown, becoming wider and triangular behind.

Cuora trifasciata, var., Gray, Cat. Shield Reptiles in B.M. p. 42. Specimen *c*.

Hab. China (*J. Reeve, Esq.*); Formosa (*R. Swinhoe, Esq.*).

The surface of the shell is often more or less eroded; the one which we first received from Mr. Reeve was so on the whole upper surface. The form of the foot, as well as the height and thickness of the shell, at once separates this species from *Cuora trifasciata*, with which I formerly confounded it.

Mr. Swinhoe informs me that this Tortoise is very abundant in the ponds in the district of Tamsuy, N.W. Formosa. He did not fall in with it in South Formosa, where the *Emys bennettii** is the prevailing species. He has frequently seen the Tamsuy Tortoise showing its head and the top of its back on the surface of the water in ponds about the rice-fields, and has watched them basking, several at a time, on the tops of large stones in such ponds.

iii. *The hind feet flattened, fringed; toes webbed and with band-like shields above.*

4. Cuora.

The thorax rather convex, more or less three-ridged. The sternum flat; lobes subequal, both enclosed in the symphysis. Head flat at top; eyes lateral. The front of the fore legs with large scales. The toes all banded above, webbed. The claws conical. The hind feet depressed; the hinder edge fringed and angularly produced. Asiatic.

* *The head large, flat, with two yellow streaks on each side; back one-coloured; toes broadly webbed.* Cuora.

Cuora amboinensis, Gray, Cat. Shield Reptiles B.M. p. 41.

Hab. Amboina; Gilolo (*Wallace*); Borneo (*Wallace*).

** *Head smaller, oblong, with two dark streaks on each side; back three-banded; toes narrowly webbed.* Pyxiclemmys.

Cuora trifasciata, Gray, Cat. Shield Rept. B.M. p. 42.

Hab. China.

5. Lutremys.

Thorax depressed. Sternum flat; lobes subequal, both enclosed in the symphysis. Head ovate; eyes superior. The legs with large scales in front. The feet depressed; toes webbed, banded above; the hind feet fringed and angularly produced behind. Claws elongate, acute.

Lutremys europæa, Gray, Cat. Shield Reptiles B.M. p. 40.

Hab. Europe.

Very variable in colour.

* *Emys sinensis* proves to have been founded on the young state of this species, as is shown by the fine series of specimens brought from Formosa by Mr. Swinhoe.

iv. *Toes webbed; they and legs covered with very small scales; front legs only with thin band-like plates in front; the lobes of the sternum narrow.*

6. Notochelys.

Back convex, flattened above. The sternum flexuous; lobes rather narrow, truncated in front and behind. The legs and toes covered with minute scales; the front legs having a series of broad, thin, band-like shields in front. Toes webbed. Claws acute.

This genus is like a true *Emys* in most of its characters; but the sternum is scarcely raised above the underside of the margin, and is united to the thorax by a cartilaginous symphysis; the lobes are separated by a straight depressed suture, but scarcely moveable. It differs from all the other *Cistudinæ* in the legs and toes being covered with minute lanceolate scales as in *Batagur*, with only a few very narrow shields near the claws.

Notochelys platynota.

Emys platynota, Gray, P. Z. S. 1834, p. 54.
Cyclemys platynota, Gray, Cat. Shield Reptiles B.M. p. 43.
Hab. Sumatra; Singapore (*Wallace*).

The head with a pale streak on each side, extended down the upper part of the sides of the neck.

The young specimens have one small black spot on the back edge of the areola of the costal, and two on the back edge of the areola of the vertebral plates.

In the *aberrant Cistudinæ* the lobes are only moveable in the young state; the transverse suture that divides the bones of the sternum into two parts is straight and transverse, while the front edge of the pair of ventral shields overlaps its edge and forms a sinuous line in front of the suture. The lobes of the sternum are narrower than the opening of the thorax, as in *Emys*, and do not cover the legs when they are contracted.

This genus forms the transition to the Tortoises with solid and fixed sternum; but it is easily known from them by the sternum being scarcely raised above the margin of the thorax, and by the existence of the cartilaginous sutures between the sternum and thorax.

7. Cyclemys.

The thorax convex or depressed. The sternum flat or slightly convex, with the lateral symphysis well marked, truncated before and notched behind; the cross suture indistinctly marked and narrow, more or less obliterated in the adult, covered with the produced front edge of the ventral shields. The legs covered with large, band-like, thin plates in front. The toes banded above; the front one short, webbed. The hind feet flattened, with the toes broadly webbed; the hinder edge keeled and angularly produced.

* *Thorax depressed, suborbicular.*

1. CYCLEMYS ORBICULATA, Bell, P. Z. S. 1834, p. 17.

Cyclemys dentata (adult), Gray, Cat. Shield Reptiles B.M. p. 42, t. 19.

Shields brown-rayed.

Hab. Java.

The small figure of *Emys dentata* of my 'Illustrations of Indian Zoology' represents, I think, probably the young of *Geoëmyda grandis*, Gray (Ann. & Mag. N. H. 1860), judging by the series of specimens brought by M. Mouhot from Camboja. The larger figures are those of a young *Batagur*.

** *Thorax oblong, convex.*

2. CYCLEMYS OLDHAMII.

Thorax oblong, convex; back flattened, bluntly keeled, and with a convexity in front, and two acute prominences at the end of the two last vertebral shields; costal plates rather convex, with the areola on the upper hinder margin; shields concentrically striated, brown, with some black lines on the part of the costal shield near the lateral keels; margin toothed behind. Thorax flat; shields pale, with dark rays.

Cestudo dentata (adult), Gray, P. Z. S. 1857, p. 183; Bell, Testudinata, t. (with animal)?

Hab. Mergui (*Professor Oldham*); Siam (*M. Mouhot*).

I was formerly inclined to believe this was an adult of the former species; but we have lately received a second specimen, which proves that it is perfectly distinct.

3. CYCLEMYS OVATA.

Thorax ovate, grey-brown, convex, hinder edge acutely dentated; the middle of the back rather flattened, bluntly keeled in front and above, and acutely keeled on the shelving hinder parts; the side shelving, the front slightly and the hinder part rather deeply impressed; the upper part of the costal plates convex; the sternum pale grey-brown.

Hab. Sarawak (*Wallace*, no. 138).

The specimen is not in a good state; probably the animal had been in confinement and was out of health; the cross suture on the sternum is much eroded on the edge, and the shell seems to be discoloured.

There is a second specimen, which was presented to the British Museum by Sir Andrew Smith, C.B., without any habitat, which is perhaps a younger stage of the species; but it does not show any mark of the transverse suture on the sternum, and the marginal plates are all broad and equally so, while, in the specimen from Borneo, the fourth, fifth, and sixth lateral marginal plates are much

broader than the others on each side, and ascend up into the margin of the costal ones; and the sides of the shell are rather more convex in front, and only slightly and not so deeply impressed behind.

The shell is uniform pale brown above, and brown below, with regular close radiating paler rays, which are wider and more distinct



near the margin of the shield. The areola on the vertebral shield is close to the hinder margin, near the upper hinder angle of the costal shields, and it is near but not on the hinder outer edge of the sternal shields.

The dried animal is brown; the front edge of the fore legs are covered with irregular-sized scales.

Mr. Bell, in his 'Testudinata,' gives two figures of the underside of the shell of his *Cyclemys orbiculata*; and in his text says that he cannot assent to M. Bibron's referring this species to the genus *Cistudo*. These undersides evidently represent two distinct species; and the upper figure of the two shows the very cross suture that Mr. Bell denies to exist.

The lower figures represent the sternum of *Cyclemys orbiculata*, with the lobes, especially the hinder ones, narrower than the openings in the thorax.

The upper figure represents a species where the lobes are broad and rounded, and nearly as broad as the aperture in the thorax.

It indicates the existence of a species which has not occurred to me, and to which the name of *C. bellii* may be applied. Perhaps it is one of the specimens which he received from either Madras or Bombay; for he says he has received them from those countries as well as from China; and I have not seen any specimens of the genus from either of these two localities.

All the three specimens of this species in the British Museum have the lobes of the sternum narrow, like the lower figure. The figure of the shell with the animal in Mr. Bell's work better represents *Cyclemys oldhamii* than the depressed, flattened *C. orbiculata* of Java.

7. On Two New Birds from Madagascar. By Alfred Newton, M.A., F.Z.S.

The collection of birds made by my brother, Mr. Edward Newton, the Assistant Colonial Secretary at Mauritius, and a Corresponding Member of this Society, on his second visit to Madagascar, besides the species already described (*anteà*, pp. 85 and 165), contains two specimens of species which I believe are as yet unrecognized. Both, as it happens, appear to be in immature plumage, and it is therefore not without some degree of hesitation that I venture to characterize them as new.

The first is a Harrier, which I propose to call

Circus macrosceles, sp. nov.

C. *aspectu* Circo cyaneo *generaliter similis, sed statura valde majore.*

Descr. maris hornotini. *Coloribus omnino ut in exemplis* Circi cyanei *ejusdem ætatis, sed striis scapinis ventris longioribus, caudæ tegminum latioribus, et rectricum transversalibus angustioribus clarioribusque.*

Long. tota 22·75, alæ plus quam 15*, caudæ 10, tarsi 4, dig. med. cum ungue 2·75, rostri culminis 2 poll. angl. et dec.

Hab. In Madagascar.

Mus. Norvicensi.

Obs. I describe this species as new, chiefly relying on Mr. J. H. Gurney's opinion. He is very confident that it is distinct from any previously characterized, and considers that it comes nearer to *C. assimilis* of Australia than to any other Harrier. Both in colouring and size it is altogether unlike *C. maillardi*, which, in its immature plumage, has some resemblance to *C. æruginosus*; while this is, as stated above, more like *C. cyaneus* at that stage. (Cf. Sclater in 'Ibis,' 1863, pp. 163–165.)

The next bird is a little Flycatcher, which, though not without some doubt, I refer to the genus *Erythrosterna*, and propose to call

Erythrosterna (?) brunneicauda, sp. nov.

E. *ad* Erythrosternam parvam *multo appropinquans, sed cauda unicolore.*

Descr. fœminæ junioris (?). *Supra olivaceo-murina, remigibus externe pallidius limbatis; subtus rufescenti-albida; rostro nigricante, pedibus schistaceis, iridibus pallide flavis.*

Long. tota 4·62, alæ 2, caudæ 1·45, tarsi ·71, dig. med. cum ungue ·48, rostri ·38 poll. angl. et dec.

Hab. In Madagascar.

Mus. A. et E. Newton.

* *In exemplo unico remigum extremitates multo sunt abrasæ; si sint integræ, probabiliter* 1½ *poll. angl. longiores forent. In exemplo* C. cyanei, *ejusdem sexus et ætatis, ex Britannia, mensuræ sunt*

Long. tota 19, alæ 13·5, caudæ 8·5, tarsi 2·75, dig. med. cum ungue 1·88, rostri culminis 1·25.

Obs. No species of *Erythrosterna* has hitherto been found, that I am aware of, in Madagascar, or even in South Africa; and I am not acquainted with any previously known Madagascar species of which this could be the undescribed female. I have therefore no alternative but to characterize it as new. I think it quite possible that future naturalists will decline to receive it into the genus to which I have here assigned it; but for the present I believe it cannot be better placed. It has very much the general appearance of the female of the European *Erythrosterna parva*, except that it wants the white spot on either side of the tail, which in that species forms so conspicuous a feature.

My brother's observations on these and the other birds procured by him on his last visit to Madagascar will appear in the forthcoming Numbers of the 'Ibis,' for July and October 1863.

May 26, 1863.

Dr. J. E. Gray, F.R.S., in the Chair.

Mr. R. Swinhoe exhibited a specimen of the rare Wader named *Pseudoscolopax semipalmatus*, in full summer plumage, obtained in Northern China.

The following papers were read:—

1. Synoptical List of the Species of Felis inhabiting the Indian Region and the adjacent parts of Middle Asia. By E. Blyth.

Having enjoyed favourable opportunities of studying most of the Asiatic species of *Felis*, and considering that they are in need of elucidation, chiefly from casual or individual varieties (which do not exemplify particular races) having been described as peculiar species, I trust that a list of what I am led to regard as species, with their numerous synonyms in some instances, will prove acceptable to students of zoology.

The most different from the rest is—

1. Felis jubata, Schreber.

F. guttata, Hermann.
F. venatica, A. Smith.
F. fearonis (?), A. Smith, apud Gray.

Chita, or "Cheetah," or "Hunting Leopard" of authors, though *F. pardus* is more commonly known by the former appellation in many parts of India. Original Παρθὸρ et *Leopardus* antiquorum; the latter name founded on the notion (still current in Barbary) of

its being a mixed race produced between the Lion and the female Pard.

Hab. All Africa; Syria; Arabia; Mesopotamia; Persia; West and South India; Ceylon (auct. Baker*).

The rest of the Asiatic Cats may be divided into, the *Pardine series* (inclusive of the Lion and Tiger), with more robust form of skeleton, and comparatively rounded and obtuse ear-conch; and the *Lyncine series* (inclusive of the Domestic Cat), with constantly a more slender form of skeleton, and larger and more pointed ear-conch, which, in general, is more or less tufted.

Pardine series.

2. Felis leo, L.

Leo barbarus, senegalensis, gambianus, capensis, asiaticus, et *goojerattensis* auctorum.

Varies much in shade of hue and development of mane, and of hair along the flanks, in the male sex—some individuals (both in Asia and Africa) being permanently maneless, or comparatively so†, though it does not appear that these anywhere constitute a distinct and established race, any more than do occasional beardless individuals among the ordinarily bearded races of humankind.

Hab. South Asia and Africa, and formerly (within historic times) the south-east of Europe. Within the present century, distributed over much of Central, West, and North-west India; but now confined in that country to the peninsula of Guzrat, unless a last remnant still maintains a lingering existence in the jungles bordering the Sind River in Bundelkund, which I now consider doubtful. Eastward of the north-west provinces of the Bengal Presidency, the Lion has not been observed in any part of Asia.

3. Felis tigris, L.

Hab. Peculiar to Asia, extending westward as far as Mount Ararat. A few are annually killed in Turkish Georgia. More numerous in the Elburz Mountains, south of the Caspian (the ancient Hyrcania). North of the Hindu Kosh, Tigers occur in Bokhara, and proved troublesome to the Russian Surveying Expedition on the shores of the Aral in midwinter. They are also found on the banks of the Irtisch, and in the Altai region; and thence eastward to Amur-land, or Amuria (where very destructive to cattle), and round by China and Indo-China to India, southward of the Himalayas; but the species does not extend into Ceylon. It inhabits the Malayan peninsula, Sumatra, Java, and Bali, but is not met with in Borneo, neither does it occur in the great Tibetan region of high Central Asia.

* 'Eight Years' Wanderings in Ceylon,' by S. W. Baker (1855), p. 118. This author clearly distinguishes between the Chita and the Pard.

† *Vide* Layard's 'Discoveries in the Ruins of Nineveh and Babylon,' p. 487; also Barth's 'Travels and Discoveries in North and Central Africa,' i. p. 482; v. pp. 97, 270.

4. Felis pardus, L.

F. leopardus et *F. varia*, Schreber.
F. nimr, Ehrenberg.
F. panthera, Erxleben.
F. antiquorum, Fischer. } (auct. Gray).
F. melas, Péron.
F. chalybeata, Hermann.
F. fusca, Meyer.
F. longicaudata, F. Cuvier.
F. pœcilura (?), Valenciennes.
The Pard, Panther, or Leopard.

Hab. S. Asia and Africa; commonly miscalled "Tiger" in Africa and also in Ceylon. In the Malayan region, it inhabits the peninsula, Sumatra, and Java; but not Borneo.

5. Felis uncia, Schreber.

F. pardus, Pallas.
F. panthera, Erxleben (auct. Gray).
F. irbis, Ehrenberg.
F. tulliana, Valenciennes, Comptes Rendus, xlii. 1035.
The Ounce, or "Snow Leopard."

Hab. Snowy regions of Middle Asia. The animal described by M. Valenciennes was procured in the mountains east of Smyrna.

6. Felis japonensis.

Leopardus japonensis, Gray, P. Z. S. 1862, p. 262, pl. xxxiii.
Hab. Japan.

7. Felis diardii, Desmoulins; Cuvier, Oss. Foss.

F. macrocelis, Temminck.
F. macroceloides, Hodgson.
F. nebulosa, Griffith.

Hab. Mountainous parts of South-east Asia, with the islands of Sumatra and Borneo; Tibet (auct. Hodgson).

N.B. The ground-colour of this animal becomes much more fulvous with age.

8. Felis marmorata, Martin.

F. charltoni, Gray.
F. diardii, apud Jardine, Nat. Libr.
F. ogilbii, Hodgson, Calc. Journ. N. H. viii. p. 44.

Hab. Apparently the same range as the preceding species, or perhaps not quite so extensive. And the ground-colour would similarly appear to become more fulvous with age.

9. Felis brachyura.

Leopardus brachyurus, Swinhoe, P. Z. S. 1862, p. 352, pl. xliii.
Hab. Formosa.

10. Felis viverrina, Bennett.

F. viverriceps, Hodgson.
F. bengalensis, apud Buchanan Hamilton.
F. himalayana, Warwick, auct. Jardine, Nat. Libr. (?), nec Gray.
F. celidogaster, Temm., auct. Gray.*
Hab. India (with Ceylon); Burma (common in the Tenasserim provinces). Found only in the lower valleys of the Himalaya. Malacca and Formosa, apud Swinhoe, P. Z. S. 1862, p. 353.

11. Felis bengalensis, Desmoulins.

F. sumatrana et *F. javanensis*, Horsfield.
F. minuta, Temminck.
F. undulata, Schinz.
F. nipalensis et *F. pardichrous*, Hodgson.
F. wagati, Elliot†.
Leopardus ellioti, chinensis, reevesii, et *Chaus servalinus*, Gray (rufous-tailed variety).
F. nipalensis, Vigors and Horsfield (hybrid?, or Domestic Cat of Nepal?‡).

* Brit. Mus. Catal., but not of Temminck (1855), who recognizes a West-African species as his *F. celidogaster*, to which he refers the figure assigned to *F. chalybeata* in Griffith's English edition of Cuvier's 'Règne Animal,' vol. ii. pl. 2. See 'Esquisses Zoologiques sur la côte de Guinée,' par M. Temminck, 1e partie, les Mammifères, p. 86. *F. himalayana*, Gray, is perhaps *F. celidogaster*, Temm.

† This has been assigned to *F. viverrina*; but it does not appear that Mr. Walter Elliot ever obtained the latter, and he presented me with a living specimen of *F. bengalensis* as his *F. wagati*.

‡ "The Domestic Cat is as common in Nepal as elsewhere, and has no peculiarity worthy of note. Judging by its marks, I should conjecture that it is derived from the *F. nipalensis*; if so, it has lost by domestication the fine ground-colour of that beautiful species."—*Hodgson in Journ. As. Soc. B.* i. p. 341.

Pennant was assured that the male specimen originally described by him "swam on board a ship at anchor off the coast of Bengal. After it was brought to England, it coupled with the female cats, which twice produced young. I saw," he remarks, "one of the offspring, which was marked in the same manner as the male parent; but the ground-colour was cinereous." (History of Quadrupeds, i. p. 293.) Various other wild species (both of the *Pardine* and *Lyncine* series) interbreed more or less freely with the Domestic Cat in different countries.

Mr. E. L. Layard (in his 'Catalogue of the South African Museum,' 1862) notices, that "*F. caffra* intermingles freely with the domestic race which has been imported by the European settlers, and the mixed progeny possesses all the ferocity and bloodthirstiness of the wild parent." A hybrid of this kind is in the British Museum Collection, as noticed by Dr. Gray (Catal. 1843, p. 45).

Mr. Walter Elliot, formerly of the Madras Civil Service, assured me of the occurrence of hybrids between the Domestic Cat and *F. chaus*, and also of similar hybrids with *F. rubiginosa* (*vide* Journ. As. Soc. B. xvii. pp. 247, 559). Dr. D. Scott, of the late Bengal Army, and formerly of Hansi, assured me of the occurrence there of hybrids with *F. ornata*, and that many of the Domestic Cats of that part of India were undistinguishable from the wild *F. ornata*, as some of those of the Scottish Highlands are from the European Wild Cat (*vide* Jardine, Nat. Libr., *Felinæ*). I was assured by the late Dr. Kelaart that he had seen a hybrid from *F. viverrina* in Ceylon.

For some remarks on the Domestic Cats of India, *vide* Journ. As. Soc. B. xxv. note to p. 443. The *Chaus pulchella*, Gray, appears to me to be only an Egyptian variety of the Domestic Cat.

Hab. South-east Asia, from Tibet to the great islands of the Archipelago; but perhaps not Borneo.

Varies much in its markings, though scarcely more so than *F. pardalis* and other spotted Cats; while the varieties are linked together by intermediate specimens. The most permanent of them would seem to be that designated *javanensis*, from Java and the Malayan peninsula, which approximates to *F. viverrina* in colouring, except that the under parts are *pure* white, black-spotted.

12. Felis jerdoni, nobis, n. s.

Very similar in its markings to the preceding species; but the size of the full-grown animal much smaller—that of *F. rubiginosa*; and the ground-hue of the upper parts grey, untinged with fulvous.

Hab. Peninsula of India. I first detected an adult male and a kitten of this species in the Museum at Madras, and find that there is an adult specimen also in the British Museum.

13. Felis rubiginosa, Is. Geoffroy; figured by Bélanger.

Hab. Peninsula of India, Coromandel side. (In the British Museum is a specimen labelled from Malacca, collected by Capt. Charlton; but this I very strongly suspect to be a mistake.)

14. Felis planiceps, Vigors.

Hab. Malayan Peninsula; Sumatra; and Borneo.

15. Felis aurata, Temminck.

F. temminckii, Vigors (young).
F. moormensis et *murmensis*, Hodgson.
"Fire Cat" of Burma? (*Mason*).

Hab. South-east Himalaya; Burma (?); Malayan Peninsula; Sumatra; and probably Borneo. A Nipalese specimen in the India Museum is very distinctly and conspicuously spotted.

Lyncine series.

16. Felis torquata, F. Cuvier; Sykes?.

F. ornata, Gray (Hardwicke's Ill. Ind. Zool.; very bad).
F. servalina, of Jardine (nec Ogilby, nec *Chaus servalinus*, Gray).
F. huttoni, Blyth.
F. ad oxam, Pallas (auct. Gray).
Leopardus inconspicuus, Gray.

Hab. The desert region of North-west India; Dukhun; Hazara country.

The "Desert Cat" of West India (*vide* Journ. As. Soc. B. xxv. p. 441). Colonel Sykes's specimen has much the aspect of a Domestic Cat, perhaps semiwild.

17. Felis manul, Pallas.

F. nigripectus, Hodgson.

Hab. Tibet and East Asia (Amurland).

18. Felis megalotis, Temminck.

Hab. Timor (non vidimus).

19. Felis chaus, Güldenstädt.

F. catolynx, Pallas.
F. affinis, Gray.
F. dongolensis, Hemprich & Ehrenberg.
F. caligata (?), Bruce.
F. lybica, Olivier.
F. kutas, Pearson.
F. rüppellii, Brandt.
Lynchus erythrotis, Hodgson.

Hab. India; North Burma (Arakan); South-west Asia; North-east Africa. South Africa, apud Layard (who gives Kuruman as one locality), in addition to *F. cafra*.

N.B. The Egyptian specimen now living in the Society's Gardens is absolutely similar to the common animal of Bengal.

20. Felis caracal, Schreber.

Hab. South Asia and Africa; Central India.

21. Felis isabellina, Blyth.

The Lynx of Tibet.

Has the naked pads of the soles of the feet much more developed than in *F. lynx* of Europe.

2. Descriptions of Thirteen New Species of Birds discovered in Central America by Frederick Godman and Osbert Salvin. By Osbert Salvin, M.A., F.Z.S.

(Plates XXIII., XXIV.)

A partial investigation of the collections made by myself and Mr. F. Godman in Guatemala and the adjacent republics during the latter part of 1861, 1862, and the early part of the present year (1863) has led to the separation of the present thirteen species, which I now propose to describe as new. There are no marked forms amongst them, the greater part being Central American representatives of North or South American species, the only truly South Mexican and Central American genus being that of *Cardellina*, of which I now describe a third species. The specimens were collected at various points, the district of Peten producing the most novelties; no less than four out of the whole number were obtained in that part. Our collection from there was small, and I think that more remains to be discovered in that remote region than in any other part of Guatemala. The alternations of savannas and forest offer scope for variety not to be met with elsewhere. Where such

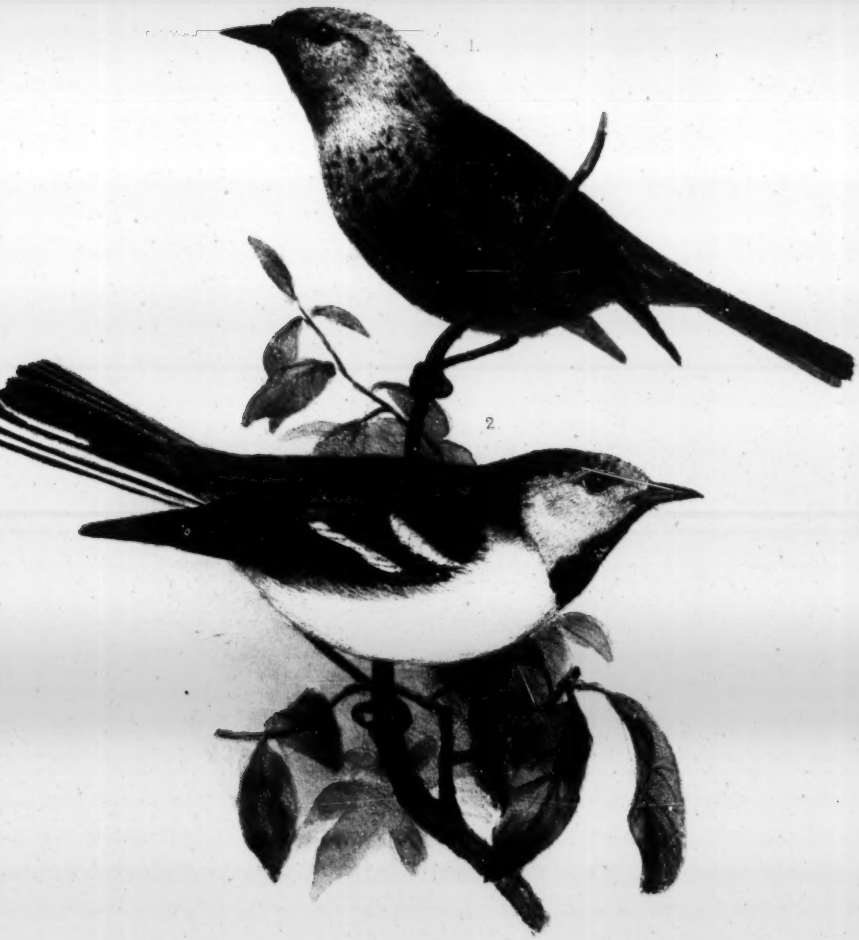


J. Wolf ad nat. lith.

T.W.Wood, Hanwell, Imp.

PANYPTILA SANCTI JEROMI.

BRITISH
3 AU 64
MUSEUM


1.
2.

BRITISH
3 AU 64
MUSEUM

a bird as *Meleagris ocellata* exclusively exists, more may naturally be looked for; and I much regret my stay there was so limited. A remarkably pleasant cruise down the west coast of Central America in the 'Guatemala' also bore fruits, as Capt. Dow and I took every opportunity to go ashore with our guns; and Realejo and Punta Arenas have added two species to our present list. The rest are from the high lands, districts I had left unexplored in my previous journeys. I must thank Dr. Sclater for his kind assistance in determining the species.

1. THRYOTHORUS PETENICUS, sp. n.

Subtus brunneus, uropygio rubidiore; superciliis et loris albis, regione postoculari brunnea; lateribus capitis et colli albis nigro minute striatis; alis fusco-brunneis vix nigro transvittatis; cauda nigra, duabus externis rectricibus albo irregulariter punctatis, duabus mediis fusco-brunneis, his cum rectricibus reliquis nigro fasciatis; gula, pectore et ventre medio albis, lateribus corporis brunneis; crisso albo fasciis nigris transvittato. Rostro superiore corneo, inferiore albidiore; pedibus fuscis.

Long. tot. 5·1, alæ 2·3, caudæ 2; rost. a rictu 0·9 poll. Angl.

Hab. Peten.

Similis *T. modesto* ex Guatemala et Costa Rica, sed rostro longiore fasciisque caudæ et crissi differt.

This species, though like, is apparently quite distinct from *T. modestus*, its nearest ally, the more strongly impressed markings of the ear-coverts, the less rufous colour of the under parts, and the well-defined bars of the crissum pointing to its distinction. I am well aware that this latter feature would not alone justify specific separation, some species of the genus *Troglodytes* presenting great variety in this respect; but considered in conjunction with other characters, it must not be altogether rejected.

2. DENDRŒCA NIVEIVENTRIS, sp. n. (Pl. XXIV. fig. 2.)

D. chrysoparia, Scl. P. Z. S. 1862, p. 19, & Cat. p. 354.

♂. *Fronte, regione oculari et capitis lateribus flavis; pileo nigro vittato; nucha pure nigra; dorso nigro griseo mixto, uropygio fere omnino griseo; primariis et secundariis obscure fuscis, in pogonio externo griseo marginatis; tectricibus alarum minoribus nigris, mediis albo terminatis, majoribus nigris, in pogonio externo griseis, macula alba terminatis; rectricibus nigris, tribus utrinque lateralibus macula longa in pogonio interno alba; duabus externis in pogonio externo albis, deinde nigris usque ad terminum, rectricibus interioribus griseo marginatis; subtus gula et pectore superiore pure nigris, deinde omnino albis, lateribus vix nigro striatis; tectricibus subalaribus albis; rostro nigro; pedibus fuscis.*

♀ *similis mari, gula nigra absente.*

Long. tot. 4·85, alæ 2·7, caudæ 2·25.

A speciebus similibus *D. townsendi*, *D. virente* et *D. chrysoparia* corpore inferiore immaculato facile dignoscenda.

We obtained at different times three specimens of this species, the first from the upper parts of the Volcan de Fuego, the second from a pine-forest near S. Gerónimo, and the third near the silver-mines of Alotepeque on the Honduras frontier. The species also ranges into Mexico, it being this bird, not the true *D. chrysoparia*, which Dr. Sclater obtained from M. Boucard's collection.

3. CARDELLINA VERSICOLOR, sp. n. (Pl. XXIV. fig. 1.)

Rubra, dorso obscuriore, abdomine et uropygio clariore; capite toto cum collo et pectore argentescenti-rubris; alis et cauda fusco-nigris, illarum secundariis internis et tectricibus majoribus in pogonio externo rubro marginatis; tectricibus minoribus macula rubra terminatis; tectricibus subalaribus et margine interno primariorum albis; rostro nigro; pedibus fuscis.

Long. tot. 4·5, alæ 2·5, caudæ 2·25.

Hab. Guatemala, in regione alta (8000 ped.).

Found frequenting the edges of the forest, at an elevation of 8000 ft. and upwards; Volcan de Fuego, amongst alders; Totonicapam, Chilasco.

4. VIREO PALLENS, sp. n.

Supra obscure olivaceus, capitis lateribus concoloribus, regione præoculari pallide flava; subtus albus vix flavo tinctus; alis caudaque fuscis externe olivaceo marginatis, secundariis internis in margine albidioribus; tectricibus alarum macula albida terminatis; rostro superiore brunneo, inferiore albido; pedibus fuscis.

Long. tot. 4·6, alæ 2·3, caudæ 2, remigis spurii ·93.

Hab. Realejo in Nicaragua et Punta Arenas in Costa Rica.

Shot by Capt. J. M. Dow and myself amongst the mangrove-bushes at the back of the above towns.

5. VIREO OCHRACEUS, sp. n.

Similis præcedenti, sed colore flavo-ochraceo, non albo, vix flavo subtus lavato distinguendus; supra etiam clarius olivaceus.

Long. tot. 4·5, alæ 2·2, caudæ 1·9, remigis spurii ·85.

Hab. San José de Guatemala.

6. VIREO SEMIFLAVUS, sp. n.

Similis præcedentibus, sed flavo corporis inferioris differt; remige etiam spurio breviore.

Long. tot. 4·35, alæ 2·1, caudæ 1·9, remigis spurii ·65.

Hab. Peten, in regione campestri.

Hi Vireones *Vireoni noveboracensi* similes sunt, sed corporibus inferioribus concoloribus facile dignoscendi.

There certainly appear to be three distinct species of *Vireo* here. Their differences may be thus shortly compared:—

V. pallens.	*V. ochraceus.*	*V. semiflavus.*	*V. noveboracensis.*
Longest spurious primary, pale under surface.	Moderate spurious primary, rounded; yellow-ochre colouring below; smaller than *V. pallens.*	Shortest spurious primary, yellow beneath; smaller than either *V. pallens* or *V. ochraceus.*	Short spurious primary; white throat and abdomen; yellow flanks.

7. Petrochelidon littorea, sp. n.

Supra æneo-viridis; subtus gula alba, corpore toto cum crisso et uropygio albis, lineis angustis nigris striatis; macula alba supra regionem præocularem; remigibus et rectricibus virides-centi-nigris, interne fuscis; secundariis in pogonio externo albo anguste marginatis; rostro et pedibus nigerrimis.

Long. tot. 4·5, alæ 3·75, caudæ 1·8.

Similis *P. albiventri* ex America meridionali, sed colore æneo-viridi non cæruleo facile dignoscenda.

Hab. Amer. cent., regione littorali.

This Swallow frequents all the low rivers and sea-coasts of both oceans, from Belize to Colon on the Atlantic, and from Soconosco to Panamá on the Pacific; and it seems strange that it has hitherto escaped observation, so common is it everywhere on the coast. It breeds in old Woodpeckers' holes in the snags in the rivers.

8. Spizella pinetorum, sp. n.

Similis S. pusillæ *ex Amer. sept. et Mexico, sed coloribus clariori-bus et rostro robustiore differt.*

Inhabits the pine-ridges and savannas of Peten, living amongst the taller patches of grass.

9. Ammodromus petenicus, sp. n.

Supra niger fusco-brunneo mixtus; alis caudaque brunneis, loris griseo-albidis, stria postoculari brunnea; gula et abdomine al-bidis, illa stria utrinque laterali nigra, pectore et lateribus cum crisso pallide brunneis, campterio pallide flavo; rostro corneo, mandibula inferiore albidiore; pedibus pallide flavis.

Long. tot. 5, alæ 2·25, caudæ 3·15.

Hab. Peten, in regione campestri.

Similis *A. manimbæ* ex Brasilia, sed loris albidis et gulæ striis dignoscendus.

10. Junco alticola, sp. n.

Cinereus, regione oculari, pileo et nucha obscurioribus; ventre medio fere albo; lateribus, crisso et uropygio brunnescentiori-bus; primariis fusco-nigris, pogonio externo medialiter cinereo marginato; secundariis internis fusco-nigris, pogonio externo et regione interscapulari brunneis, hac paulo obscuriore; rec-tricibus fusco-nigris, duabus externis macula alba interne ter-minatis; rostro nigro, mandibula inferiore albido terminata; pedibus fuscis.

Long. tot. 6·25, alæ 3·1, caudæ ·3.

Hab. Guatemala, in regione alta (8000 ped.).

Similis *J. cinereo* ex Mexico, sed coloribus obscurioribus rostroque robustiore facile dignoscendus.

Evidently the Guatemalan representative of the Mexican *J. cinereus*.

11. CHRYSOMITRIS ATRICEPS, sp. n.

Olivacea; capitis lateribus griseis; abdomine medialiter cinereo; dorso postico et uropygio viridescenti-flavis; pileo toto et gula nigris, hac obscuriore; remige externo omnino nigro, secundi et tertii pogoniis externis medialiter flavo marginatis, quarti et reliquorum pogoniis externis in parte basali flavis, in parte terminali nigris flavo marginatis, pogoniis internis omnium flavo marginatis; secundariorum parte basali flava, parte terminali nigra, macula olivacea externe terminata; duabus rectricibus internis nigro-fuscis, reliquis flavis nigro terminatis; rostro superiore fusco, inferiore pallidiore; pedibus fuscis.

Long. tot. 4·85, alæ 2·9, caudæ 2.

Hab. Quezaltenango, alt. 8000 ft.

The two specimens from which the above description is taken differ considerably in coloration from one another, one being in old and somewhat worn plumage, the other more freshly moulted and brighter olivaceous. They are both males; and the former, from the greater amount of yellow in the spots on the wings, I consider as the older bird. This variation in the extent of yellow on the wings and tail is seen in the allied species *C. notata*, the female having less than the male. At first sight the present species might be taken for the young of *C. notata* (in which the sexes are almost alike); but the longer wings and more deeply forked tail point to its distinctness.

The two specimens were shot by Mr. R. Owen and myself amongst a patch of thistles near Quezaltenango, in August last (1862).

12. ELAÏNEA ARENARUM, sp. n.

Fusco-olivacea; pileo, alis caudaque obscurioribus; gula et pectore griseis, illa paulo dilutiore; abdomine toto, crisso et tectricibus subalaribus flavis; secundariis internis fusco-albo externe marginatis; tectricibus alarum macula fusco-alba terminatis; rostro et pedibus nigerrimis.

Long. tota 5·6, alæ 2·8, caudæ 2·7.

Hab. Costa Rica.

Shot by Capt. J. M. Dow and myself near Punta Arenas.

13. PANYPTILA SANCTI-HIERONYMI, sp. n. (Pl. XXIII.)

Purpureo-nigra; gula, pectore et torque postico pure albis, macula alba utrinque uropygii et frontis lateralibus; primariis tribus externis omnino nigris, reliquis in pogonio interno albo marginatis, secundariis albo terminatis, deinde fusco subterminatis; rostro nigro; pedibus vestitis.

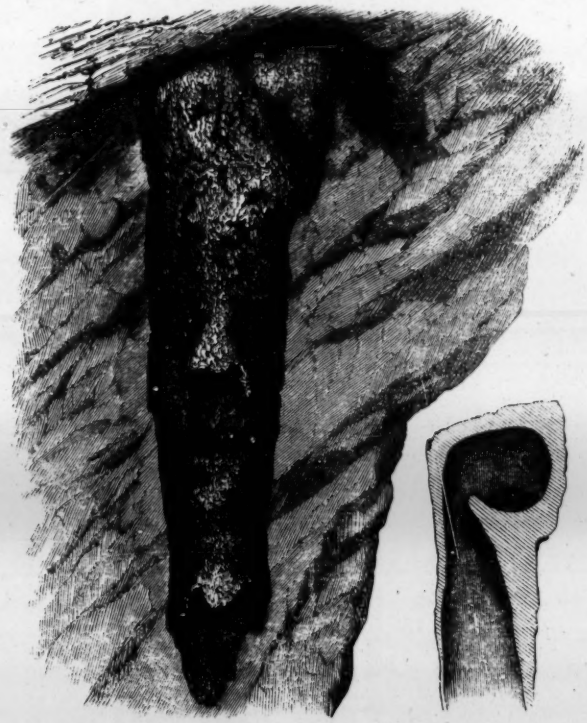
Long. tot. 7·5, alæ 7·5, caudæ 3·6.

Similis *P. cayennensi*, sed major.

Hab. San Geronimo in reipub. Guatemalæ.

Nest.—The nest of this species is composed entirely of the seeds of a plant, secured together and hung from the under surface of an overhanging rock by the saliva of the bird. The whole structure measures 2 feet 2 inches in length, and is about 6 inches in diameter. The entrance is at the end, and the hollow for the eggs at the top.

The first time we met with this beautiful Swift was near San Gerónimo in Vera Paz, soon after our arrival in Guatemala in 1861. I then recognized it as distinct from *P. melanoleuca*, but afterwards, not having secured specimens, imagined we must have mistaken it for that bird. In July of last year (1862) I had the satisfaction of



having brought to me alive, by Mr. Carter of San Gerónimo, two birds which clearly showed that our first impression was correct.

They had been caught by an Indian under a rock near the village

of Matanzas, in the mountains. The birds, though apparently uninjured, were quite sleepy, not attempting to fly; the only energy they exhibited was by making their powerful claws meet in my fingers when I endeavoured to secure them. I afterwards, on several occasions, observed them flying over the plain with amazing swiftness during dull rainy evenings of July. Later on in the autumn Mr. Hague, of San Gerónimo, secured for me the nest which I now exhibit. He found it, during a visit to some Indian ruins in the neighbourhood, sticking to the under surface of an overhanging rock.

The bird was distinctly seen to enter several times; but Mr. Hague was unable to shoot it, owing to its rapid flight. There were no eggs in the nest. In this nest we see the saliva of the bird used as an adhesive material in nest-building, as in the genus *Collocalia* of the Old World, but differently applied. At first sight the saliva appears to have been used merely to secure the foundation of the nest (if the term may be applied inversely) to the overhanging projection of rock upon which the rest of the structure is woven, as in the nests of the Icteridæ; but upon closer examination it will be seen that the saliva has been applied to secure every one of the seeds used in the construction of the nest, and in no other way could so firm and durable a structure be attained. Another curious feature will be noticed in this nest,—which is, the false entrance at the side. I remember to have seen a similar thing in other nests; I think they were Australian. They appear to be placed there to deceive some enemy, such as a snake or lizard, to the attacks of which the parent bird or its offspring would, during the time of incubation, be more exposed. It would be interesting to know how the materials for this nest were gathered, whether from the plant itself, or caught in the air by the bird as the seeds were carried by the wind.

3. On the Species of the Genus Sternothærus, with some Observations on Kinixys. By Dr. J. E. Gray, F.R.S., etc.

The shell or thorax of the *Sternothæri* offer such different appearances, according to the age or other special conditions under which they have lived, that it is almost impossible to distinguish them; and the more specimens are received, the greater becomes the difficulty. Under these circumstances, as the heads seem to present some characters which, as far as I have been able to observe them in the limited number of specimens which come under my examination, seem permanent, I have attempted to define the peculiarities presented by the heads of the specimens in the Museum Collection from different localities. The species were so difficult to distinguish by means of the shell only, that, in my 'Catalogue of Shield Reptiles in the British Museum,' I stated that all the species there noticed "perhaps may prove only to be varieties of the same species, or dependent on age" (p. 52).

A larger series of specimens from the same locality has shown that such characters as the shape and thickness of the shields, and

especially of the first vertebral shield, which have been hitherto to some extent depended on for the separation of the species, are very variable. Therefore the discovery of some other more permanent characters seems important; and the form and disposition of the shields on the head appear to furnish such characters.

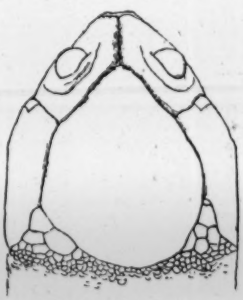
Mr. Cope observes that *S. derbianus* differs from *S. sinuatus* of Smith "mainly in the form of the upper mandible, which is obtusely hooked in the former, bidentate in the latter." I suspect he must have been misled in these observations by figures or descriptions; for the jaws of the typical specimens of the two species are very similar.

It will be necessary to separate the genus into three sections, according to the form of the head, premising that I only know the species belonging to the third section from the descriptions of MM. Duméril and Bibron, as all the specimens that have come under my observation belong to the first or second sections. These sections may be thus characterized:—

I. *Head short and broad; the upper jaw obscurely notched and bidentate in front; the crown shielded to a line even with the back of the tympanum.* Tanoa.

1. STERNOTHÆRUS SINUATUS, A. Smith, S. African Zool. t.

Head rather broad, depressed; jaws pale; the temporal plate



Head of *S. sinuatus*.

broad and short, only reaching to the front of the tympanum, and with another rather smaller similar plate behind it over the ear; the hinder vertebral plate of the adult as wide as long, not tubercular; the fore legs with small scales, and with some very wide, slender, band-like shields on the inner side of the upper surface; the sternum with a narrow deep notch behind.

Sternothærus castaneus, part.; Gray, Cat. Shield Rept. B.M. p. 52.

Hab. S. Africa: Natal (*Dr. Krauss*).

In other specimens the front marginal shields are rather wide, the middle one as long as broad; the front vertebral shield is elongate, with straight sides.

I think it better to retain the name given by Dr. Andrew Smith to the Natal specimen for this species; for it is very doubtful to which of the specimens the *Emys castanea* of Schweigger is referable, and one of the specimens I described as *S. castaneus* is certainly *S. derbianus*.

2. STERNOTHÆRUS DERBIANUS.

Pentonyx gaboonensis, A. Duméril, Arch. du Mus. x. p. 164, t. 23. f. 2 (young).

The head very broad, depressed; jaw dark, black-lined; the temporal plate single, broad and long, reaching to the back of the tympanum; the upper surface of the front leg with moderate-sized scales, and with many larger, convex band scales on the inner side; the hinder edge of the fourth and the upper edge of the fifth vertebral plate tubercular; the sternum with a deep rounded notch behind; the vertebral plate of the adult longer than broad.

Hab. W. Africa: Gaboon; Sierra Leone.

Our specimens offer several varieties, thus:—

1. Front marginal plates thick, convex, broader than long; the front vertebral shield elongate urn-shaped.

2. Front marginal plates as long as broad, flat; the front vertebral shield elongate urn-shaped.

3. Front marginal plates as long as broad, flat; the front vertebral shields elongate, with straight sides.

In one specimen of the first variety the vertebral shields are much narrower than in the other.

The shield on the crown of the head in the two specimens which have heads is more or less perfectly divided into three shields, viz. one frontal and two occipital, but together they cover the whole top of the head to a line with the back of the ears, and there are only a few small shields between the hinder side of the hinder part of it and the back edge of the temporal shields.

I think there can be very little doubt that the specimen which M. Aubrey Lecomte sent to the Paris Museum from the Gaboon, and which M. Auguste Duméril, in his very hasty and very incomplete and inaccurate paper "On the Reptiles of Western Africa," in the 'Archives du Muséum' (vol. x. p. 165), has described and figured under the name of *Pentonyx gaboonensis*, is only the young state of this species. One is surprised that a herpetologist who must have unrivalled opportunities of study should not have been led by the breadth of the lobes of the sternum to have doubted its being a *Pentonyx*. However, it is well, as it gives their museum a representative of a species which they did not formerly possess. But, what is more extraordinary still, M. A. Duméril, who is so ready with and so bitter in his observations on the works of others, though this figure shows that the horny plates consist almost entirely of the areolæ of the large shields, with only two or three rings of deposit round them, showing that the animal could not long have been hatched, yet observes, "L'aspect de la carapace et sa solidité comparée à celle de la boîte osseuse de jeunes *Pentonyx* du Cap semblent prouver que

notre individu est adulte" (p. 164). The example figured must be that on which this observation is founded; for he observes, "Il est unique dans la collection."

It is probable that *Emys adansonii* of Schweigger, the *Pentonyx*, and more lately the *Sternothærus adansonii* of Duméril and Bibron, described from a shell in the Paris Museum said to come from the Cape de Verd, is probably only a half-grown specimen of this species, which is the only *Sternothærus* I have seen from Western Africa.

The specimen in the British Museum from Sierra Leone, which is described in the 'Catalogue of Shield Reptiles' (p. 52) as *Sternothærus castaneus*, appears to belong to this species.

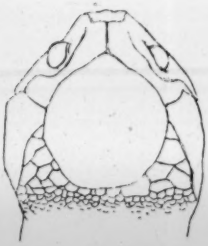
II. *The head rather short and broad; the upper jaw truncated; the crown covered with an oblong shield (or three smaller shields), with a number of smaller shields over the tympanum, between the hinder outer edge of the crown-plate and the upper edge of the large temporal shields.* Notoa.

STERNOTHÆRUS SUBNIGER.

S. castaneus, Dum. et Bibr. Erp. Gén. ii. p. 401, t. 20. f. 1.

Head depressed; jaws pale; the upper surface of the fore legs with small scales, and a few rather larger ones on the inner sides.

Hab. Madagascar.



Head of *S. subniger*.

The specimen in the British Museum, which was received from Paris under the above name, and as coming from Madagascar, agrees well with Duméril and Bibron's description and figure; but they do not describe the small shields on the head, and especially say that the frontal plate is much developed, and that there are no occipital plates. Now, in our specimen the sutures of the occipital plates are well seen, and they are peculiar for being oblong and obliquely placed (so as to leave the sides of the occiput to be covered with small shields), instead of being large and trigonal (as they are in the two other species) and covering all the space on the head to the margin of the temporal shields.

III. "*Head elongate; upper jaw with a recurved crown, with a moderate beak, frontal, two long nasal, and two large parietal plates.*" Anota.

STERNOTHÆRUS NIGER, Dum. et Bibr. Erp. Gén. ii. p. 597 (not t. 20. f. 1, as quoted).
Hab. Madagascar.

We have recently received from Western Africa several specimens of the genus *Kinixys*, and they all tend to prove the distinctness of the three species in the 'Catalogue of Shield Reptiles in the British Museum,' viz. 1. *K. belliana*; 2. *K. erosa*; and 3. *K. homeana*. *K. belliana* is easily separated from *K. erosa* (as well as by other characters) by the small size of the gular plates. It would appear that this species is common both to West and Eastern Africa, as Mr. Whitfield brought it from the Gambia, Dr. Peters found it in Mozambique, and Dr. Rüppell at Shoa: so also is *K. homeana*; for Lieut. Friend found it at Cape Coast in West Africa, and Mr. Berthold on the east coast of Africa.

The *K. erosa* seems to be common in several parts of West Africa. It is abundant at Gaboon, and seemingly not uncommon at the Gambia. It is a very variable species, but always to be distinguished by the reflexed and strongly dentated posterior margin, and the large size of the gular plates. It varies in form. Some specimens are oblong-elongate, narrow, as wide before as behind (that is to say, straight on the sides): these, as the older specimens have the sternum concave, which we generally consider the peculiarity of the male sex, are probably male. Others are ovate, much broader compared with their length, and broader behind than before, and the sides of the back are more convex: these are probably the shells of females. The specimens of both these shapes are varied with yellow on the upper side of the costal plates, and have short irregular yellow rays at the outer angle of the costal and vertebral shields; but the distinctness of these coloured rays varies in the different specimens. The form of the gular plates also varies; they are always rather large, and the front outer angles are rather produced forward, leaving a deep angular notch; but in one specimen, which has a concave sternum, and is probably an old male, they are very much enlarged, and produced beyond the upper edge of the thorax. They are longer than broad, and truncated in front, so as to present a straight margin without any notch, they are as long as the humeral plate at the inner side, and the front margin of them is as broad as the length of the outer side, which is concavely curved out. There seems, from M. Auguste Duméril's figure, to be only a thorax, without any sternum, of this species in the Paris Museum.

The most natural division of this genus is the following:—

A. The front lobe of the sternum narrowed and tapering in front, with a small truncated pair of gular shields; the sides of the margin even; nuchal shield distinct. *Kinothorax.*

1. KINIXYS BELLIANA.

B. The front lobe of the sternum broad; side curved outwards, with a large pair of gular shields produced at the outer angles; the sides and the margin strongly dentated. *Kinixys.*

1. KINIXYS EROSA. The fifth vertebral plate rounded; nuchal none.

2. KINIXYS HOMEANA. The fifth vertebral plate produced, angular; nuchal plate distinct.

4. On the Arrangement of the Cetaceans. By Dr. John Edward Gray, F.R.S., etc.

In the part of the 'Zoology of the Erebus and Terror' devoted to the Cetacea I collected together all the materials within my reach, and published an arrangement of the genera, and notes on all the species, of these animals which were then known to me, either from the examination of the specimens in different museums, or from the descriptions and observations in various zoological and whaling works. The first part of the 'Catalogue of the Specimens of Mammalia in the Collection of the British Museum,' which is devoted to the Cetacea (published in 1850), may be considered as a revision of the former essay, with the additional material that I had been able to collect since it had been penned. During the thirteen years that have elapsed since the publication of the Catalogue I have not allowed any opportunity to escape of examining and comparing the different specimens which have come under my observation, and I have read with care all the papers and works that I have been able to meet with bearing in any way on Whales and their allies. I am now induced to lay the results, as far as the general arrangement of the order is concerned, before the Society.

Some zoologists pay little regard to such re-arrangements of genera and the division of them into groups; but this arises from the points of view from which they regard them. If they look on them as only artificial keys to discover the name of a genus, and thus arrive at the name of a species, and if that is the object of the person who forms them, then they are perhaps estimated at their right value. But I have laboured at these and other arrangements which I have suggested with a very different view. If it is considered desirable to place the species in natural groups called genera, it is certainly equally desirable that the genera so formed should be disposed in the larger and larger groups in such an order as appears to the writer most distinctly to exhibit the natural relations which the genera bear to each other. If they are so disposed, then the name that is given to a group of species is of little importance, as to whether the group is called a genus or subgenus, a genus or subfamily, or a family. They may be so regarded at the caprice or theory of the student, as, whatever may be their nominal value, they are intended to represent a natural group of species, arranged together so as best to represent, according to the writer's view, the natural relation of the species to each other.

If the arrangement of the species into genera requires mature deliberation and the study of the value of the different characters observed as to their permanence and variability in each group (and the variations in different organs are often of very different value in this respect in very nearly allied groups), then the arrangement of the minor groups into larger and larger ones, according to my experience, and indeed as any one may *à priori* suppose, demands a greater power of comparison and reasoning, since there are a greater number of facts, of characters, and of resemblances or differences, and of variation or permanence, to be considered and reasoned on—that is to say, if the constituents of the larger groups are conscientiously examined and determined on, as they must be to render them of value for the purposes above stated.

I am aware that this is not the feeling of many zoologists, but I believe this arises from most zoologists restraining themselves to the study of a limited number of species or genera. This is proved by the fact that many zoologists pay great attention as to who was the first person who gave the name to a genus, though the genus may have been restricted, or even extended, and its characters completely altered since the name was first applied, but pay little or no attention to the first person who formed a group, or to the synonymy or history of the changes which have taken place in the characters or arrangement of the group or genera themselves. This is not the case with botanists, who are generally much better grounded in the philosophy of science. They are careful in giving the synonyms of the families and subfamilies, as may be seen in works of DeCandolle and others. And it is very desirable that the same attention should be paid to the subject in zoological essays.

The order Cetacea must be divided into two suborders, viz. Cete and Sirenia. I have nothing to add to the arrangement of the second suborder.

Suborder I. Cete.

Skin smooth, bald. Teats two, inguinal. Limbs clawless; the fore limbs fin-shaped; hinder united, forming a forked horizontal tail. Nostrils enlarged into blowers. *Carnivorous.*

I. *The nostrils longitudinal, parallel or diverging, covered with a valve, one often larger and more developed.*

Fam. 1. Balænidæ.

Head very large, depressed. Nostrils separate, nuchal. Teeth not developed in the adult. Palate furnished with transverse horny fringed plates of *baleen or whalebone.*

a. *Dorsal fin none; belly smooth; baleen elongate, slender; vertebræ of neck united; pectoral broad, truncate at end.*

1. Balæna. Pectoral fin moderate. Head one-third of the entire length.

b. *Dorsal fin distinct; belly plaited; baleen short and broad; vertebræ of neck more or less free; pectoral lanceolate.*

2. MEGAPTERA. Pectoral fin elongate. Dorsal fin low, truncate.

3. BALÆNOPTERA. Pectoral fin moderate. Dorsal fin falcate, two-thirds the entire length from nose. Vertebræ 46 or 48.

4. PHYSALUS. Pectoral fin moderate. Dorsal fin falcate, three-fourths the entire length from nose. Vertebræ 54–64.

Fam. 2. CATODONTIDÆ.

Head large, subcylindrical, blunt. Lower jaw narrow. Teeth large, in the lower jaw only, fitting into pits in the gums of the upper one. Nostrils separate, one often abortive. The hinder edge of the maxillary elevated, forming a concavity on the forehead of the skull. Pectoral broad, truncated.

* *Head subcylindrical, truncated; nostril in front of the truncated head; dorsal hump rounded.*

1. CATODON. Head very large, one-third of the entire length of the animal.

** *Head depressed, rounded in front; nostrils in the forehead; dorsal fin falcate.*

2. PHYSETER. Head very large, one-third of the entire length of the animal, rounded, convex above. Teeth conical, compressed. Skull elongate?

3. KOGIA = *Euphyseter*, Wall. Head short, very broad. Forehead convex. Teeth conical, cylindrical. Skull very short and broad.

Fam. 3. PLATANISTIDÆ.

Head small, long-beaked, beak compressed. Teeth in both jaws, at first cylindrical, becoming compressed. Blowers linear, parallel, over the eyes. The sides of the maxilla elevated, forming a vaulted cavity over the forehead. Pectoral broad, truncated.

1. PLATANISTA.

II. *Nostrils united into a single transverse or crescent-shaped blower. Head moderate, more or less beaked. Teeth in both jaws, often deciduous. The pectoral fin lanceolate, tapering.*

Fam. 4. INIADÆ.

The head beaked, beak hairy. Teeth rugulose, crown with an internal process. Back without any fin, keeled behind. Pectoral fin large.

1. INIA.

Fam. 5. DELPHINIDÆ.

Head more or less beaked, smooth. Teeth simple, cylindrical, conical, smooth. Back rounded. Dorsal fin distinct, falcate, rarely wanting.

A. *Head more or less beaked; beak of the skull as long, or longer, than the brain-cavity.* Bottlenoses.

a. *Pectoral fins moderate, lanceolate, far apart on the sides of the chest; teeth in both the jaws permanent.* Delphinina.

1. PONTOPORIA. Beak of skull rather compressed, high. Symphysis of the lower jaw very long. Dorsal medial.

2. STENO. Beak of the skull rather compressed, higher than broad. Symphysis of the lower jaw rather elongate. Dorsal medial.

3. DELPHINUS. Beak of the skull rather depressed, convex above. Dorsal medial.

4. DELPHINAPTERUS. Beak of the skull rather depressed, convex above. Dorsal none.

5. LAGENORHYNCHUS. Beak of the skull depressed, expanded. Head shelving in front. Dorsal rather posterior.

b. *Pectoral fins small, low down, and rather close together on the middle of the chest; upper jaw toothless; lower jaw with few teeth, sometimes deciduous.*

* *Maxillary bones elevated into a crest on the sides behind; teeth two or four, anterior conical.* Hyperodontina.

6. HYPERODON. The crest of the maxillary bone thin and wide apart above. The beak of the skull descending downwards. The hinder edge of the skull as high as the crest. Lower jaw rather curved. *Hyperodon rostratum.*

7. LAGENOCETUS. The crest of the maxillary bones very thick and close together, especially above, where they are flat-topped. The beak of the skull horizontal. The hinder edge of the skull lower than the top of the crest. Lower jaw straight. *Lagenocetus latifrons.*

** *Maxillary bones simple; teeth, on the sides of the lower jaw, compressed.* Ziphiina.

8. BERARDUS. Lower jaw gradually tapering in front. Teeth, two, in the front of the jaw large conical.

9. ZIPHIUS. Lower jaw gradually tapering. Teeth on the sides of the jaw large, compressed.

10. DELPHINORHYNCHUS. Lower jaw gradually tapering. Teeth on the sides of the jaw small, conical. (Perhaps the female of the former.)

11. DIOPLODON. Lower jaw broad behind, suddenly tapering in front. Teeth on the sides of the jaw large, compressed. *Dioplodon densirostris.*

B. *Head rounded in front, not beaked; beak of the skull scarcely as long as the brain-cavity.*

a. *Pectoral fins falcate, elongate, low down, near together on the chest; head very swollen; intermaxillary bones very wide, covering the maxilla above; teeth conical; side of maxilla expanded horizontally.* Globiocephalina.

12. GLOBIOCEPHALUS.

b. *Pectoral fins ovate, wide apart, lateral; intermaxillary bones moderate.* Phocænina.

† *The lateral wing of the maxilla horizontally produced over the orbit; dorsal distinct; teeth conical.*

13. ORCA. Teeth large, acute, permanent. Intermaxillaries moderately wide.

14. GRAMPUS. Teeth early deciduous. Intermaxillaries broad.

†† *The lateral wings of the maxilla shelving down over the orbit.*

* *Teeth permanent, compressed, sharp-edged.*

15. PHOCÆNA. Dorsal triangular, central.

16. NEOMERIS. Dorsal fin none.

** *Teeth early deciduous, conical; dorsal none.*

17. BELUGA. Teeth in both jaws early deciduous.

18. MONOCEROS. Teeth very early deciduous. Male with a projecting spiral tusk in the upper jaw.

The greatest desideratum of zoology is the power of examining some specimens of the genus *Physeter*, or Blackfish, as it is called by the whalers. There is not a bone, nor even a fragment of a bone, nor any part of an animal that can be proved to have belonged to a specimen of this gigantic animal to be seen in any museum in Europe. This is the more remarkable as the animal grows to the length of more than fifty feet, is mentioned under the name of the Blackfish in almost all the Whaling Voyages; and two specimens of it were examined by Sibbald, having occurred on the coast of Scotland. The only account which we have of the animal on which zoologists can place any reliance is that furnished by Sibbald in his 'Little Tractate on Scotch Whales.'

Boyer, in the 'Nova Acta Naturæ Curiosorum,' describes a Whale found at Nice which has been thought to be a Blackfish, on account of the position which he assigns to the blower; but the figure which he gives is so much like a bad design of a Spermaceti Whale (*Catodon*) in other respects, that it is doubtful to which genus it properly belongs.

I am aware that in some catalogues of osteological specimens

some conical or small worn-down Whale's teeth are named as if they belonged to this genus, or to the "High-finned Cachalot," as it is called; but these teeth are not to be distinguished from the teeth of the younger true Sperm Whales. Mr. Wall, in his account of the Australian Sperm Whale, thinks the skeleton of the Whale at Burton Constable is the skeleton of a Blackfish; but Anderson, in his account of this animal, particularly says, "The nostrils were at the end of the snout," and the skeleton is that of a true *Catodon*, as is proved by careful examination.

It is to be hoped that some whaler will preserve the skull, if not some of the other bones, of the animal called the "Blackfish," which, according to the account of Sibbald, must yield a good quantity of spermaceti; for he mentions that four men were seen inside the cavity of the cranium extracting the sperm, or, as he calls it, "the brain." Yet Beale, in his 'History of the Sperm Whale,' specially says, after well describing the difference between the *Sperm Whale* and the *Blackfish*, that they do not produce spermaceti (p. 11). But I may observe that, according to Bennett and Nunn, in the Pacific the name of Blackfish is given also to the large Dolphin described by me as *Globiocephalus macrorhynchus*.

5. On the Eyes of Emydidæ and Batrachia. By Dr. J. E. Gray, F.R.S., etc.

There is no character that an animal offers that is not worthy of study; and my attention has lately been called to the eyes of the freshwater Tortoises, and they have afforded me some information which I believe important. All the paludinal Terrapens which I have been able to examine have a large square dark spot on each side of the iris. This spot, with the pupil, forms a dark band across the eyes. I have observed this to be the case in the species of *Emys*, *Pseudemys*, and *Chrysemys*; and on looking at Holbrook's 'North American Herpetology,' where the animals are all figured with care from life, we find that he represents and describes all the North American species of *Emydes* as having this band across the eye. I may observe that I have also seen it in a South American Tortoise, which I have called *Geoclemmys annulata*; and I think it is also found in *Testudo scabra*, another tropical American Terrapen with separate toes. These animals have been called *Rhinoclemmys* by Fitzinger. They are probably a natural genus, characterized by this peculiarity in the eyes. All the American species of *Geoclemys*, the two species of *Cistudo* figured by Holbrook, the æstuarian Terrapen *Malaclemys*, the aquatic Box-Tortoises *Kinosternon* and *Aromochelys*, and the Lacertine Terrapens *Chelydra* and *Macroclemys*, have an annular iris without any interruption. It will be interesting to observe the eyes of the Asiatic and European species; but this can only be relied upon in living specimens, as the spot on the angle of the eye is not to be observed in the specimens preserved

in spirits, where only the circular pupil is distinctly marked even in the American *Emydes*.

P.S. When this paper was read, it was observed that the Tritons and Toad had the same peculiar spot on the sides of the iris, and that it was common to the Batrachia. This is a mistake; the European and North American species of *Bufo*, *Rana*, *Hyla*, and *Hylodes* have an oblong-transverse pupil, with an oblong ring-like iris, the upper portion of which is often differently or more brightly coloured than the lower; but this form of pupil is not universal in the tailless Batrachia; for, according to Dr. Holbrook, the genus *Scaphiopus* has a small circular pupil, and the iris divided into four equal parts by black radiating lines. According to the figures of the same author, who had all the species figured from life, the North American Salamanders and Tritons, the *Amphiuma*, *Menopoma*, *Siren*, and *Menobranchus*, all have small circular pupils, with an annular iris. The *Triton cristatus* of England, *T. marmoratus* of Spain, and *T. alpestris* of Germany, have a circular ring-like iris; and the only Batrachians which appear to have the spot on each side of the iris, forming a band across the eyes, are the English *Lophinus punctatus* and *L. palmatus*, the band on the eyes looking in these like a continuation of the dark streak on the side of the head. I may add that the best character for the distinction of these two species, which are often found in the same pond, is, that in *L. punctatus* the crest of the male is scalloped on the edge, and high in front; while in *L. palmatus* it is low in front, and higher behind, and has a smooth straight upper edge. The tail of the latter is also always truncated, and usually appendaged at the tip.

6. On the Species of Zosterops inhabiting China and Japan, with the Description of a New Species. By Robert Swinhoe, F.Z.S., etc.

The genus *Zosterops* is represented in China by two species, one inhabiting South China and the island of Formosa, the other North China, from Shanghai northwards into Amoorland. The species peculiar to Japan has been described by MM. Temminck and Schlegel in the 'Fauna Japonica,' and is allied to both the Chinese species, but quite distinct from either. I proceed to characterize briefly the two Chinese species.

Zosterops simplex, Swinhoe, Ibis, 1863, p. 294.

Similis Z. palpebrosæ *ex India, sed major; supra magis viridis; alis caudaque saturatioribus.*

This species ranges in China from Canton to Foochow, and perhaps a little higher; but not to Shanghai, where it is replaced by the following. In Formosa it is also an abundant resident. On its nesting and habits I have already written much in the 'Ibis,' and will not therefore here repeat my remarks. It has its nearest ally in *Z. palpebrosa* of India, being, like it, light grey on the under parts. An

occasional specimen or two, however, may be picked out of my Amoy series with a tinge of chestnut-brown on the under parts, showing the tendency of the species towards the Japanese *Z. japonica*. Some have the belly deeper grey than others. The yellow on the throat and vent varies in intensity, as also does the green of the upper parts; but these are chiefly distinctions of sex and age. I have one pale, almost yellow variety, procured by Capt. Blakiston at Canton. All the adults have the black lore- and eye-line peculiar to so many of this group. I have specimens from Hong Kong, Macao, Canton, Amoy, Foochow, and Formosa; and they all agree in essential characters.

ZOSTEROPS ERYTHROPLEURA, n. sp.

Z. chloronotus, v. Schrenck (nec Gould).

Lateribus utrinque saturate castaneo-rufis.

Long. alæ 2½ poll., caudæ 1·7.

The distribution of this species extends from Shanghai into Amoorland. I had, until lately, confounded it with the *Z. japonica* of Japan; but while on a visit to M. Jules Verreaux at Paris, I had the pleasure of examining for the first time a veritable Japanese specimen, and of comparing it with North China skins. The difference in the two birds is striking. Both have, like the preceding, black markings on the lore- and partly round the white eye-ring. The under parts of *Z. japonica* are a dull light brownish chestnut, while the flanks of this species are of a deep rusty chestnut. This bird is larger and longer-winged than our South China species, but is exceeded in both by the Japanese. I here exhibit two specimens from Shanghai, kindly lent me by M. Jules Verreaux, and one from Tientsin. The two former are much brighter on the flanks than the latter; but as they are both males, and our Tientsin bird is a female, the difference may be only a sexual one, and not one of locality. What could have induced M. v. Schrenck, in his 'Amoorland,' to confuse this species with the *Z. chloronota*, Gould, of Australia, I cannot understand. I am enabled to produce a specimen of this last from M. Verreaux's collection, the shape of the bill and head of which, as well as the dull sordid colour of the plumage, show at once a marked difference from the Chinese bird. Indeed there are many species from Asia and Africa far more closely allied to our species than is the *Z. chloronota*. For comparison with the two Chinese species, I am enabled to bring before the Society the *Z. palpebrosa*, Gray, of India, the *Z. japonica*, T. & S., and two Australian species, *Z. chloronota*, Gould, and *Z. cærulescens*, Blyth. I think all practical ornithologists will agree with me in considering the three forms of Eastern Asia as distinct *inter se*, and from all others of this numerously represented group. As I have never met the North China species alive, except as a cage-bird, I have nothing special to relate regarding its habits.

7. On a New Spine-tailed Swift from Western Africa. By P. L. Sclater, M.A., Ph.D., F.R.S., etc., Secretary to the Society.

(Plate XIV. fig. 2.)

While examining the American Swifts of the genus *Chætura* in the British Museum, Mr. G. R. Gray kindly called my attention to two African species of the same genus, which have hitherto been confounded together. These are the *Chætura sabini*, described by Dr. Gray in Griffith's edition of Cuvier's 'Animal Kingdom,' and the species called *Chætura sabini* by Mr. Cassin in his 'List of the Birds collected by M. Du Chaillu on the Rivers Camma and Ogobai.'

The latter bird is obviously distinct from the former, as will appear by the following characters, and may be called *Chætura cassini*:—

(1.) Chætura sabini.

Chætura sabini, Gray, Griff. An. K. ii. p. 70; Hartl. Orn. W. Afr. p. 25.
Chætura bicolor, Gray, Zool. Misc. p. 7.
Pallene leucopygia, Boie, Isis, 1844, p. 168.
Acanthylis bicolor, Strickl. P. Z. S. 1844, p. 99.

Nigra: uropygio, caudæ tectricibus superioribus et inferioribus et ventre cum crisso albis: tectricum caudalium sup. et inf. plumarum rachidibus nigris.

Long. tota 4·0, alæ 5·0, caudæ 1·5 poll. et dec. Angl.
Hab. Sierra Leone (*Sabine*); Fernando Po (*Fraser*).

In this smaller species the tail is wholly black; and the whole of the upper and under tail-coverts are pure white, with black shafts to the feathers.

(2.) Chætura cassini, sp. nov. (Pl. XIV. fig. 2.)

"*Chætura sabinei*," Cassin, Proc. Acad. Sc. Phil. 1859, p. 33.

Nigra: uropygii fascia angusta et corpore subtus albis; pectore fuliginoso: pectoris et gulæ plumarum rachidibus nigris.

Long. tota 4·8, alæ 6·3, caudæ 1·2.
Hab. Gaboon (*Du Chaillu*).

In this species the upper tail-coverts are black, crossed by a narrow white bar, which extends through and is partially observable on the rectrices. The size is much larger than in *Chætura sabini*, the bird being represented in the accompanying plate two-thirds of its natural dimensions.

8. Observations on the Birds of South-eastern Borneo, by the late James Mottley, Esq., of Banjermassing; with Notes by P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

My friend Mr. L. L. Dillwyn having placed in my hands some MS. notes written by the late Mr. James Mottley of Banjermassing (who was killed in the Malay insurrection at that place in 1860), together with the series of bird-skins to which the notes refer, I have, with the kind assistance of Messrs. A. R. Wallace, J. H. Gurney, and A. Newton, determined the species, and added some few remarks on their synonymy and geographical distribution.

Mr. Mottley's collection contains specimens of 134 species of Bornean birds. As no connected list has ever been published of the birds of Borneo, the present may be useful to a certain extent as a contribution to geographical ornithology, although the series is in many points obviously very imperfect.

It may be observed that the greater number of the birds of Borneo, as shown by the present collection, are common to Sumatra and Malacca. In some instances the Malaccan and Sumatran species are replaced by representatives sufficiently different to render specific separation possible. For example, we have in

Borneo.	representing the following species in	Sumatra and Malacca.
Megalæma chrysopsis,		*Megalæma chrysopogon*.
Megalorhynchus sanguinolentus,		*Megalorhynchus hayi*.
Meiglyptes badiosus,		*Meiglyptes badius*.
Mixornis borneensis,		*Mixornis sumatrana*.
Copsychus suavis,		*Copsychus macrurus*.
Edolius brachypterus,		*Edolius paradiseus*.
Crypsirrhina aterrima,		*Crypsirrhina leucoptera*.

But there are a few species (such as *Munia fuscans*) which, so far as we know at present, are unrepresented in the latter countries.

The generic types peculiar to Borneo are very few in number. *Galgulus* sive *Pityriasis gymnocephalus* is perhaps the only very noticeable type peculiar to the island; but as the interior mountains of Borneo are wholly unexplored, it is not improbable that future explorers may yet find much that is interesting in the untraversed central regions.

Fam. Falconidæ.

1. Falco peregrinus, Linn. (*Rajah wali.*)

An exceedingly courageous bird. No prey is too large for him to attack: he is even said to kill young deer. Rare.

2. Hierax cærulescens (Linn.). (*Alang lulalang*—Grasshopper Hawk.)

Not uncommon here, perpetually on the wing, and living on large insects and small birds. I have never seen so courageous a bird.

The largest birds (even those twenty times as large as itself) are attacked by it without hesitation, and generally beaten off by the activity and perseverance of their small enemy. The natives frequently discover the nest of this Hawk by the parent birds swooping at the heads of those who approach the tree where it is.

3. HALIASTUR INDUS (Bodd.). (*Alang sapa.*)

A very common but exceedingly wary bird, always to be seen sailing about. It feeds on snakes, lizards, and offal, and appears to be common all over the East.

4. PONTAËTUS ICHTHYAËTUS (Horsf.). (*Taryanng.*)

Shot by my hunter.

5. SPILORNIS BIDO (Horsf.). (*Rajah wali-laut.*)

Rare, and seen only on the coast. It feeds on fish.

6. ACCIPITER VIRGATUS (Temm.), Pl. Col. 109.

This small Hawk was much damaged, having been kept long alive with a broken foot. It was bought from a native.

7. ACCIPITER SOLOËNSIS (Horsf.).

Received from the Dyak River.

8. ELANUS HYPOLEUCUS, Gould, P. Z. S. 1859, p. 127; B. Asia, pt. 12. (*Rajah wali.*)

Shot at Pulo-sari. I saw this bird for several days, while we were there, regularly beating the padang; but one day I got near him as he sat, gorged, on a dead tree.

Fam. STRIGIDÆ.

9. KETUPA JAVANICA (Horsf.). (*Katatupi.*)

Common, though rarely seen: its note is a melancholy sound, often repeated, between a trip and a shrill whistle.

10. PHODILUS BADIUS (Horsf.). (*Punggu.*)

This bird was brought to me alive, but refused to eat anything; so I killed and stuffed it. It uttered no sound while I had it.

11. SCOPS LEMPIJI (Horsf.), juv.

Caught by my servant. I do not know this Owl in the adult state.

Fam. PSITTACIDÆ.

12. PALÆORNIS LONGICAUDUS (Bodd.), Buff. Pl. Enl. 287. (*Betet.*)

Much more common here than at Labuan, and flying in immense

flocks: they are caught with bird-lime, and sold by hundreds for the table. Their habits are somewhat modified here by the nature of their food, which is chiefly the fruit of various shrubby *Myrtaceæ*; but they always fly very high and swiftly, screaming loudly. I have neglected to get a female. She wants the long tail-feathers, and the colours are more dingy; the red patch under the eye is also very small. This bird breeds in hollow trees.

13. Palæornis javanicus (Osbeck). (*Baian.*)

My hunter procured these birds near Banjermassing: their habits, he states to me, resemble those of the last species, and they fly in equally large flocks.

14. Psittinus malaccensis (Lath.). (*Chaling.*)

This little Parrot is much more rare here than the other species. My hunter says he has never procured it except in the neighbourhood of Banjoenan. It can be taught to speak.

15. Loriculus galgulus (Linn.). (*Seringit.*)

Very common here, frequenting open grassy places with small scattered trees, in the holes of which it breeds. Almost every native house here has its little round cage with one or two of these little birds. They are easily caught with lime-sticks placed round a caged bird, which is hung at the top of a long pole.

Fam. Cuculidæ.

16. Rhinortha chlorophæa (Raffles).

Often seen, but apparently of very wandering habits, as they are rarely met with two days together in the same place. They fly in small flocks, and seem generally to be employed searching for caterpillars upon the leaves of trees. In all I have killed (a large number) the stomachs were filled with these insects, and with the bodies of *Lepidoptera*. The only note I have heard from them is a quick chirp.

17. Phœnicophaus erythrognathus, Temm.; Bp. Consp. p. 98.

A rather common bird about Martapora in the dry gravelly thickets, concealing itself among the bushwoods, and when disturbed taking very short flights. Its note is a hoarse chatter, much like that of a Magpie.

18. Zanclostomus sumatranus (Raffl.), Bp. Consp. p. 99. (*Talatak Bahohong.*)

Procured by my hunter on the Rium-kiwa River. I know nothing of its habits.

19. Zanclostomus tristis (Less.), Bp. Consp. p. 99.

Procured by my hunter in the marshes near Banjermassing: he says it has a different note from the last species, and a different flight; and

that the natives give it a different name, which, however, he does not recollect. There appears to be a difference in the nostrils.

20. Oxylophus coromandus (Linn.), Bp. Consp. p. 102.

This species, from the Dyak River, was previously unknown to my hunter.

21. Cacomantis sepulchralis (Müll.), Bp. Consp. p. 104.

Rare: they haunt open padangs, where they perch on very low bushes.

22. Hierococcyx varius (Vahl), Moore, P. Z. S. 1859, p. 459. *H. fugax*, Bp. Consp. p. 104. (*Rangang.*)

A common bird, though rarely seen, from its habit of lying as it were on the upper side of a large branch to utter its monotonous cry. I have repeatedly tried in vain to discover it, when certainly a dozen must have been crying at once all around me. Its note is a loud but soft flute-like whistle, repeated three times, and then once again, two notes lower, and is continued for several hours together in the evening.

23. Surniculus lugubris (Horsf.), Bp. Consp. p. 105. (*Jandarassi hitam.*)

Shot near Martapora: they appear to have the habits of our Fly-catchers.

24. Chrysococcyx xanthorhynchus (Horsf.), Bp. Consp p. 106. (*Behet.*)

This bird is apparently rare. The present specimen was full of flies.

25. Chrysococcyx chalcites (Temm.), Temm. Pl. Col. 102; Bp. Consp. p. 106.

Small bird, not known to my hunter.
[A young bird, probably referable to this species.—P. L. S.]

26. Centropus philippensis (Cuv.), Bp. Consp. p. 107.

Here exceedingly common. Its monotonous note "*boo-boo*," repeated sometimes for hours together, may be almost constantly heard in wet bushy places; hence the native name Booboot. It is said to feed very much on the eggs of other birds. Its nest is large and bottle-shaped, built of moss-leaves and rubbish, and though often placed in conspicuous places, may be easily passed from its resemblance to a chance mass of leaves.

27. Centropus affinis (Horsf.). *Cuculus affinis* (♂) et *C. lepidus* (♀), Horsf. Trans. Linn. Soc. xiii. p. 180.

This species, the note of which is almost exactly like that of the last, is found very commonly in the "padangs" or extensive grassy

clearings. In flying, it rises only just over the grass, and never perches in sight, always diving suddenly into some thick tuft or bush. It is often much mobbed by other small birds. Its nest is bottle-shaped, and placed among grass, of which it is chiefly built, rarely quite upon the ground. Its Malay name is "*Telutok*."

Fam. CAPITONIDÆ.

28. MEGALÆMA VERSICOLOR (Raffl.), Bp. Consp. p. 143. (*Tukang Kagu.*)

Exceedingly common here; feeds chiefly on insects, but also on the fruit of various species of *Ficus*. When these are ripe, several dozen of the birds may often be seen on the trees together. They breed in holes, which they excavate in the rotten wood of trees.

29. MEGALÆMA CHRYSOPSIS, Goffin, Mus. des Pays-Bas, Buccones, p. 15. (*Tokon Tokon mas.*)

Rare: procured by my hunter far up the Riam-Kiwa River.
[Barely separable from *Megalæma chrysopogon*, Temm.—P. L. S.]

30. MEGALÆMA MYSTACOPHANES (Temm.), Pl. Col. 315. (*Tokon Tokon Kechel.*)

Obtained by my hunter near Martapora.

31. MEGALORHYNCHUS SANGUINOLENTUS (Less.). (*Tapeas.*)

Rather uncommon. I shot both these specimens in a tall Fig-tree (*Ficus*) covered with fruit; but I doubt their feeding on it, as their stomachs were full of insects.

[There seems no doubt that this Bornean bird—the *Caloramphus sanguinolentus*, Less. (Rev. Zool. 1839, p. 139)—is distinct from the Malaccan *M. hayi*, although these species have been repeatedly united. The Malaccan bird never shows the red colour on the throat, which seems constant in Bornean specimens.—P. L. S.]

Fam. PICIDÆ.

32. MEIGLYPTES BRUNNEUS (Eyton), Bp. Consp. p. 113.

In fruit-orchards; not rare.

33. MEIGLYPTES BADIOSUS (Temm.), Bp. Consp. p. 113. (*Balatak busuh*—Stinking Woodpecker.)

A common bird, rather nocturnal in its habits. When newly killed, it has an abominable smell of formic acid, doubtless from the nature of its food.

[Mr. Wallace has specimens of this bird obtained at Sarawak.—P. L. S.]

34. TIGA TRIDACTYLA, Gray: Bp. Consp. p. 120.

Procured at Abulong, on the Banjermassing River. It appears to be a species frequenting the tidal marshes.

35. VENILIA MALACCENSIS (Lath.). *Picus malaccensis*, Lath. Ind. Orn. i. p. 241; *Venilia miniata*, ex Malacca, auct.

Very common, frequenting small scattered trees in open places.

[These specimens agree with those of Sumatra and Malacca in having the hinder part of the crest yellow, and the back greenish. In the Javan representative species, *Venilia miniata* (*Picus miniatus*, Gm. ex Forst.), the whole crest and the greater part of the back are red. Malherbe figures the present bird (Picidæ, ii. pl. 76), but calls it wrongly *miniata*.—P. L. S.]

36. HEMICERCUS COCCOMETOPUS, Reichb.

Shot at Gunong Pamalong.

[Mr. Wallace's collection contains three forms of this species: 1st, that of Sumatra and Borneo, which has the rump reddish buff or reddish white, the belly buffy brown, and the crest of the male tipped with dusky; 2nd, that from Malacca, in which the belly is decidedly olivaceous, the rump yellowish, but the crest similar to the last; 3rd, that of Java, in which the rump is nearly white, the crest very ample and wholly red, and the bill shorter. Now Temminck's *Picus concretus* (Pl. Col. 90) is, as he himself states, the Javan species, and we must therefore call the Javan form *Hemicercus concretus*. The Malayan bird should bear the name *Hemicercus sordidus*, having been described by Mr. Eyton in its immature stages as *Dendrocopus sordidus*, his paper on the birds of Malacca in the 'Annals of Natural History' for 1845 (vol. xvi. p. 229). The Sumatran and Bornean species seems to be Reichenbach's *Hemicercus coccometopus* (Handb. d. Sp. Orn. p. 401). M. Malherbe, in his work on the *Picidæ*, appears to have only been acquainted with two forms; and his name *hartlaubii* is certainly synonymous with *sordidus*, though his figure (pl. 61. fig. 5) represents the whole crest as red.—P. L. S.]

37. HEMILOPHUS JAVENSIS (Horsf.), Moore, Cat. p. 652. (*Balatak kigang.*)

This Woodpecker, of which I think I sent the female only from Labuan, is here also a very rare bird. My man prided himself very much upon getting a pair of them.

38. HEMILOPHUS VALIDUS (Temm.), Pl. Col. 378, 402; Bp. Consp. p. 131.

Killed by my hunter on the Riam-Kiwa River.

39. SASIA ABNORMIS (Temm.), Bp. Consp. p. 140.

From the Dyak River; said to frequent low bushes.

Fam. CAPRIMULGIDÆ.

40. BATRACHOSTOMUS JAVENSIS (Horsf.). *Podargus javensis*, Horsf. Zool. Res. pl. 6; Bp. Consp. p. 57.

This strange-looking bird is quite nocturnal in its habits. I have

once or twice seen it, evidently asleep, on a low branch in the low dark thickets about Martapora, and each time with the huge mouth wide open.

[Mr. Mottley's collection contains two pairs of this bird. The sexes, as has been noted by Bonaparte, are very different in colouring, the male being minutely freckled with brown and black, and the female bright rufous. Horsfield's figure represents the female. Mr. Mottley's female specimens agree with Dr. Horsfield's type. *Batrachostomus stellatus* (*Podargus stellatus*, Gould, P. Z. S. 1837, p. 43) of Malacca is obviously a different species, as I have ascertained by examining the typical examples in the British Museum. *B. auritus*, Gould (Icon. Av. ii. pl. 7), is also easily known by its larger size. *B. crinifrons*, Temm. (*B. psilopterus*, G. R. Gray), from Batchian and Gilolo, is likewise a well-marked species. Whether the other three species given by Cabanis and Heine (Mus. Hein. ii. pp. 123–4) are good or not I cannot say. They have omitted to enumerate in their list *Batrachostomus moniliger* of Ceylon.—P. L. S.]

41. Caprimulgus affinis (Horsf.), Moore & Horsf. Cat. p. 114. (*Chabak.*)

An exceedingly common bird on our bare and long hills, where it breeds. It sits during the day among the stones, not rising until nearly trodden upon. In the evening some hundreds may be seen on the wing about my house, sweeping in wide circles, and constantly repeating a shrill chirp, which may be heard, when there is moonlight, through the night. At this time they often perch on prominent objects, such as the poles of the fences and the carved pieces of wood with which the Malays ornament their roofs, but this I have never seen them do in the daytime. The eggs are laid without nest among the bare stones, and are, as well as the young, like those of our English species; the mother, too, employs the same arts to tempt intruders away from her treasures.

42. Caprimulgus, sp.? (*Taktan.*)

Appears to be rare: my hunter procured this specimen at Pengaron.

[This is a well-marked species of *Caprimulgus*, with the inner web of the outer tail-feather in the male terminated by a square white mark. It does not seem to be in the British Museum; but I am unwilling to add to the confusion already prevalent in this group by describing isolated species.—P. L. S.]

Fam. Cypselidæ.

43. Macropteryx klecho (Horsf.). (*Lanigan.*)

Common in the dry season. I believe the *Cypselidæ* are all more or less migratory here.

44. Collocalia nidifica, G. R. Gray: Moore, Cat. p. 98.

Fam. ALCEDINIDÆ.

45. HALCYON LEUCOCEPHALA (Gm.), Bp. Consp. p. 154. (*Bakaka.*)

This is one of our commonest Kingfishers, and to be seen everywhere, both in fresh and brackish water, though I think rarely where the water is truly salt. It perches usually on rather high, exposed branches, and is wild and not easy to approach, flying off with a loud chatter precisely resembling its name *Bakaka*. The Malay races are particularly happy in onomatopœias of this kind. It is also called "*Rajah udong*" (king of the shrimps)—a true King-Stork, I should suppose.

46. HALCYON LILACINA, Bp. Consp. p. 156.

Procured by my hunter at Banjermassing: he says it is rare here.

47. HALCYON COLLARIS (Scop.), Moore, Cat. p. 127. (*Bakaka padang.*)

Procured on the Dyak River by my hunter, who says that this species particularly frequents the paddy-fields, and feeds on frogs.

48. CEYX RUFIDORSA, Strickl.: Bp. Consp. p. 158. (*Bintei.*)

Not uncommon, frequenting the small streams in the woods, and making its nest in holes in banks.

Fam. TROGONIDÆ.

49. HARPACTES DUVAUCELII (Temm.), Gould, Mon. Trog. ed. 2. pt. 1. (*Santalehai.*)

Brought by my hunter from the Great Dyak River, where it is said to be abundant: it is a favourite bird of omen with the Dyaks.

50. HARPACTES KASUMBA (Raffles), Gould, B. Asia, pt. 8.

From Bangkank, on the Riam Kiwa; one of the principal birds of omen of the Dyaks.

Fam. MEROPIDÆ.

51. MEROPS JAVANICUS (Horsf.). (*Pink-Pink.*)

A very common bird in open places, sailing in circles to hunt the larger Coleoptera and Hymenoptera. It also makes great havoc among the Dragonflies with which the air is sometimes filled here. When these birds have seized their prey, they return to their stand, usually a bare high branch, and there kill it by beating it against the twigs. Great numbers of them may sometimes be seen together in the evening flying in one direction, uttering the cry which gives their name.

52. MEROPS BADIUS, Gm.

Uncommon: my specimens were brought by my hunter from Bangkank, on the Riam Kiwa River.

53. NYCTIORNIS AMICTA (Temm.).

This bird is rather common at Gunong Tabok, on the Riam Kanan River, but I suppose rare elsewhere. My hunter says it is not known far in the interior. Its note is something between the croak of a frog and the "churr" of a Fern-Owl, often repeated, and sustained perhaps half a minute.

Fam. CORACIIDÆ.

54. EURYSTOMUS ORIENTALIS (Linn.).

A rare bird here.

Fam. BUCEROTIDÆ.

55. HYDROCISSA GALERITA, Temm.

Rare on the coast, but a common bird far in the interior. In both Borneo and Sumatra it may be seen perched, in the early morning, on the summits of the tallest trees; and its loud hoarse cry, like a coarse, rude laugh, makes the wood echo in every direction. This is a sacred bird with the Dyaks, who ornament their war-dresses and helmets with the beak and long tail-feathers; the large wide quills are almost universally used for holding gold-dust and small diamonds.

Fam. EURYLÆMIDÆ.

56. CORYDON SUMATRANUS (Raffl.). (*Tiong Pujong.*)

Shot by my hunter.

[These specimens have the concealed dorsal spot red. In Mr. Wallace's Malaccan examples it is orange.—P. L. S.]

57. CYMBIRHYNCHUS MACRORHYNCHUS (Gm.). (*Pandei-Pandei.*)

Here a common bird, almost always to be seen about fruit-orchards and similar places, often in flocks of five or six: it feeds apparently on insects. In fresh specimens the beak is bright blue.

58. CALYPTOMENA VIRIDIS, Raffl. (*Tantewy.*)

Shot by my hunter on the Dyak River.

Fam. ALAUDIDÆ.

59. MIRAFRA JAVANICA (Horsf.).

This bird has much the habits of our common Sky-Lark.

Fam. MOTACILLIDÆ.

60. BUDYTES VIRIDIS (Scop.). (*Pranjak.*)

Very common among grass, associating in small flocks, and hunting insects with a short jumping flight.

Fam. Timaliidæ.

61. Timalia maculata, Temm. Pl. Col. 593. fig. 1.

Brought from the Dyak by my hunter.

62. Timalia nigricollis, Temm. Pl. Col. 594. fig. 2.

Shot by my hunter at Banjermassing.

63. Timalia, sp.? (*Sikotan gunong.*)

Shot by the hunter on the Riam Kanan.

[Allied to *T. erythróptera*, Blyth, of Malacca, but differs, according to Mr. Wallace, who has kindly compared it, in having the back rusty red, of the same colour as the wings, and a much darker head. —P. L. S.]

64. Mixornis borneensis, Bp. Consp. p. 217.

Shot by my hunter at Banjermassing.

65. Macronus ptilosus, Jard. & Selb. (*Burong chamara.*)

Not uncommon, according to my hunter; but I have not seen it alive.

66. Trichostoma umbratile, Strickland, Contr. to Orn. 1849, p. 126, pl. 35. (*Kruang taush.*)

My hunter says this bird is common, though I have never seen it; he says it never flies above the grass.

[Mr. Wallace notes this species as being very close to *T. abbottii*, Blyth, from which it only differs in more rufous wings and flanks, and less greyish white on the lores.—P. L. S.]

Fam. Pittidæ.

67. Pitta schwaneri, Temm.: Bp. Consp. p. 256.

Rare, but generally distributed in dry woody places. Like *P. mülleri*, it rarely perches upon trees.

68. Pitta muelleri, Bp. Consp. p. 256.

Rather rare: haunts bushy places.

[A young bird of this species in Mr. Mottley's collection has the tips of the wing-covers white, as in Elliot's *Pitta leuccptera*. I have little doubt that the latter (described in Proc. Acad. Sc. Phil. 1861, p. 153, and figured in the 'Monograph,' pl. 25) is the young of *Pitta philippensis*.—P. L. S.]

Fam. Megaluridæ.

69. Orthotomus cineraceus, Blyth: Moore's Cat. p. 315.

A very common bird among grass, over the tops of which it flies with a quick jerking flight, often throwing up the tail.

[Compared by Mr. Wallace with specimens in the E. I. M.—P. L. S.]

70. PRINIA ——? (*Chunuk betul.*)

A common little bird in the long grass; it flies with a peculiar jerking flight, like a Grasshopper.

[A species not in the E. I. M.—P. L. S.]

Fam. PYCNONOTIDÆ.

71. PYCNONOTUS ANALIS (Horsf.). *Ixos analis*, Bp. Consp. p. 265.

Shot by my hunter near Martapora.

[This bird is often called *P. goiavier* (Scop.). But Sonnini's figure, on which Scopoli's name is based, represents a bird from Manilla, which is probably of a different species. I therefore prefer to use Horsfield's name *analis* for this bird.—P. L. S.]

72. CRINIGER GUTTURALIS, Bp. Consp. p. 262.

Fam. TURDIDÆ.

73. COPSYCHUS AMŒNUS, Horsf.: Moore's Cat. p. 279. *C. pluto*, Temm. (*Tingon.*)

An exceedingly common bird here, and apparently all over the Archipelago. It frequents the neighbourhood of houses more than most of the native birds; and its song is very sweet, something like part of that of a Blackbird. It is a very lively and active bird, and very conspicuous as it sits on the top of a stump to sing, perpetually jerking up its tail like a Magpie, to which in miniature it bears a considerable resemblance. The nest is of grass, and is placed in a fork or hole of a tree; the eggs are five or six, and resemble those of our Yellowhammer (*Emberiza citrinella*).

[Mr. Wallace tells me that Bornean and Javan specimens of this bird agree; so that *C. pluto*, the fifth species in my list of this genus (given P. Z. S. 1861, p. 186), must be united to the fourth.—P. L. S.]

74. COPSYCHUS SUAVIS, Sclater, P. Z. S. 1861, p. 185. (*Tingon.*)

A much wilder species than the last, and more rarely seen, though nearly as common.

Fam. ORIOLIDÆ.

75. ORIOLUS XANTHONOTUS, Horsf.

A rare bird, and oftener heard than seen, as it sits usually in a thick dark tree, repeating at short intervals a low melancholy whistle. I have several times tried in vain to see this bird, when perfectly sure, from its constantly repeated cry, that it was in the tree I was examining, and have only induced it to take flight by firing at random among the branches. One of the specimens sent was, oddly enough, killed in this way, without being aimed at or seen.

Fam. ARTAMIDÆ.

76. ARTAMUS LEUCOGASTER, Val.: Bp. Consp. p. 343. (*Alang-kechil.*)

This bird was sent in my former collection from Labuan, where it was common; here I have seen it only once.

Fam. HIRUNDINIDÆ.

77. HIRUNDO DOMICOLA, Jerdon, Madras Journ. xiii. p. 173.

Brought by my hunter from the Dyak.

78. HIRUNDO RUSTICA (Linn.). (*H. gutturalis*, Scop.)

[Mr. Blyth considers this Eastern variety of the Common Swallow hardly separable from the European bird, though many authors have assigned it a different name. See Cat. Mus. As. Soc. Beng. p. 197, and Jerdon, Birds of India, p. 157.—P. L. S.]

79. RHIPIDURA JAVANICA (Sparm.), Horsf. & Moore, Cat. p. 144.

Shot near Banjoenan.

80. TCHITREA AFFINIS, A. Hay: Horsf. & Moore, Cat. p. 134. (*Tabulu.*)

A rare bird here, but very conspicuous from its long tail and slow flight. It associates in small parties of five or six, and frequents low open woods. Its feathers are much valued by the Dyaks.

Fam. LANIIDÆ.

81. TEPHRODORNIS HIRUNDINACEA, Temm.: Bp. Consp. p. 357.

Found here and there in the low woods, associating in pairs, but not a common bird.

82. PACHYCEPHALA GRISOLA (Blyth). *Tephrodornis grisola*, Blyth, J. A. S. B. xii. p. 180; Jerdon, B. Ind. i. p. 411.

Rather uncommon: has a sweet simple song, something like that of the Redbreast (*Erithacus rubecula*).

[I suspect this is *Hyloterpe philomela*, Cab. (Mus. Hein. i. p. 64): but, as far as I can make out, that bird has never been described. A bird is mentioned as *Hylocharis luscinia* in S. Müller's article on his Sumatran discoveries, in the Tijdschrift v. Nat. Geschied. 1835, p. 331; but no description of it is given.—P. L. S.]

83. IRENA PUELLA (Lath.), Bp. Consp. p. 349. (*Burong Birn* —Blue bird.)

The birds are common enough here, though not very often seen, except when the wild fruit is ripe, when they collect in great numbers. Their favourite food appears to be a species of *Syzygium*: when feeding on this, they are very fat, and are caught in great numbers, for eating, with bird-lime.

84. Edolius brachyphorus, Temm.: Bp. Consp. p. 351. (*Damak-Damak*, from a fancied resemblance in the long tail-feathers to the little arrows blown from the Sumpitan, which are so named.)

This bird is not uncommon here, and I have seen it also in the north of Borneo, its peculiar jerking flight, like that of a Woodpecker, and its long tail-feathers making it very conspicuous. These birds feed on insects, and, my hunter says, sometimes on small birds. They are the bravest birds I have ever seen: one of them does not hesitate to attack the largest Hawk that ventures near its stand, and usually succeeds in driving off the intruder by repeated blows on the head with his strong beak.

85. Chaptia malayensis, A. Hay: Bp. Consp. p. 350. (*Tang-kaschang.*)

Apparently rare: one specimen that I shot was being mobbed by smaller birds.

86. Graucalus fasciatus, Vieill.: Bp. Consp. p. 354.

87. Volvocivora fimbriata, Temm.: Bp. Consp. p. 356.

Fam. Corvidæ.

88. Crypsirhina aterrima, Temm.: Bp. Consp. p. 369. (*Tiung hautu.*)

Not uncommon in the deep woods, but rarely seen near houses. These are very active and lively birds, but exceedingly wild and difficult to approach; their note is a kind of hoarse whistle often repeated.

89. Corvus validus, Temm.: Bp. Consp. p. 385. (*Kak.*)

Exceedingly wild, and rarely seen near houses. These Crows fly usually in flocks of from three to six individuals, and are very noisy on the wing. Their cry is exactly that of our Common Rook (*C. frugilegus*), and gives me a home-feeling every time I hear it; but their flight more nearly resembles that of the Common Crow (*C. corone*). The stomachs of those I have killed were full of insects and fruit; but one, which had, as I afterwards found, a nest with young ones close by, was carrying in its beak a piece of stinking fish. The nest was in a tall tree built of sticks and grass, and contained four young ones. When taken young from the nest, these birds become very tame; but are most mischievous, tearing into small pieces everything they can get hold of.

Fam. Sturnidæ.

90. Calornis cantor, Gm.

I have nothing to add to my former remarks on this bird. It is not so abundant here as at Labuan: it seems to frequent hollow trees almost exclusively.

91. Gracula javanensis (Osbeck), Bp. Consp. p. 422.

Very common here, as in Labuan.

Fam. Fringillidæ.

92. Munia oryzivora (Linn.).

Rather common here, and exceedingly destructive to the rice-fields, feeding on them in vast flocks. These birds are taken in thousands by the natives, and are a favourite article of food, being exceedingly fat. In confinement they become very familiar, and breed readily. I have a great number of them; and many which have escaped do not leave the house, but are constantly on the outside of the cage which formerly held them.

93. Munia malacca (Linn.).

94. Munia fuscans, Cassin.

Spermestes fuscans, Cassin, Pr. Acad. Phil. vi. p. 85, et Journ. Acad. Phil. iii. p. 69, pl. 8. fig. 3.

Common here, though less so than the last species. Its habits are the same; but its nest is commonly placed in hollow trees.

[Mr. Wallace has similarly-coloured specimens of both sexes of this little Finch in his collection from Sarawak.—P. L. S.]

Fam. Melliphagidæ.

95. Phyllornis javensis (Horsf.), Horsf. & Moore, Cat. p. 260.

Not very uncommon here, and almost always to be found where any of the *Loranthaceæ* are in fruit.

96. Iora viridissima (Temm.).

Procured by my hunter (who said the note and flight attracted his attention, and that the species was new to him) at the foot of the Goenong Gurgaji Mountain.

97. Zosterops ——, sp.?

Burong barat, "west bird," only seen here during the west monsoon; it frequents especially the flowers of the Lausat (*Lausium domesticum*).

[This *Zosterops* is closely allied to *Z. flava* of Java, but is distinguishable by its brighter colouring above and below, the lores being yellow instead of black, and the wing- and tail-feathers within being brown and not black. It is of the same size as *Z. flava*, and therefore can hardly be *Z. montana* of Sumatra, which is stated by Bonaparte to be "*similis* Z. flavæ, *sed paullo major*."—P. L. S.]

Fam. Nectariniidæ.

98. Dicæum cruentatum (Linn.), Bp. Consp. p. 402.

Rather common in some localities. The nest of this very lively

and pugnacious little bird is a most beautiful fabric, made with an opening in the side, and suspended from a twig, being built chiefly of lichens and spiders' webs.

99. Dicæum trigonostygma (Scop.), Bp. Consp. p. 403.

Shot by my hunter.

100. Nectarinia macklotii, Bp. Consp. p. 408.

101. Nectarinia hasseltii, Temm.: Bp. Consp. p. 409.

My hunter says, this is the only specimen he has seen here of this bird.

102. Nectarinia siparaja (Raffl.), Bp. Consp. p. 405.

Common among mangroves.

[Mr. Wallace says, "perhaps distinct from *N. siparaja*, the tail being rather more elongated."—P. L. S.]

103. Nectarinia pectoralis (Horsf.), Bp. Consp. p. 408.

Found also in Labuan; here it frequents chiefly the flowers of the Laban (*Vitex tomentosa*).

104. Nectarinia phœnicotis (Temm.), Bp. Consp. p. 408.

105. Anthreptes lepida (Lath.), Bp. Consp. p. 409.

Apparently not rare. These little *Nectariniæ* are all called by one native name, have the same restless habits as the Labuan species, and are always to be found where there are flowers. They feed, however, also on small insects.

106. Arachnothera longirostris (Lath.), Bp. Consp. p. 409. (*Chewit tandok.*)

Common in a small wood near my house, amongst the bamboos: I have rarely seen it elsewhere.

Fam. Columbidæ.

107. Treron nipalensis, Hodgs. (*Punei dakan.*)

A very common Pigeon; perhaps the most so of all our species. It has the same habits as the other kinds.

108. Treron vernans (Gm.), Bp. Consp. ii. p. 12. (*Punei daduk.*)

Very abundant: of the same solitary and fruit-eating habits as all our Pigeons, but remarkable for frequently perching on the ground.

109. Treron fulvicollis (Wagl.), Bp. Consp. ii. p. 14.

110. Treron olax (Temm.), Pl. Col. 241; Gray, List of Columbæ, p. 11. (*Punei kechil.*)

In habits like the larger species, but far more rare.

111. TRERON CAPELLII (Temm.), Pl. Col. 143. (*Bakwak.*)

Of the same habits as *Carpophaga ænea*, but much more uncommon.

112. PTILONOPUS JAMBU (Gm.), Bp. Consp. p. 17. (*Punei chitrah.*)

Here very plentiful; but said to be rare, except just in this immediate neighbourhood. My hunter, though in his business here for twelve or fourteen years, had never seen it before. It feeds on fruit, especially on that of the different species of *Ficus*.

113. CARPOPHAGA ÆNEA (Linn.), Bp. Consp. ii. p. 32. (*Pragam.*)

One of the commonest of our Pigeons, flying often in large flocks, and very destructive to the fruit-orchards. Its note is something between the ordinary *coo* of a tame Pigeon and the groan of a person in pain. Its flight is exceedingly strong and rapid. It is the best of all our wild birds for the table, and so falls a frequent victim to my hunter, who tries by that means to stand high in Mrs. Mottley's good books. Though so large and strong a bird, it is easily brought down with small shot.

114. TURTUR TIGRINUS (Temm.). *Columba tigrina*, Temm. Pig. pl. 43.

A very common bird here, frequenting padangs with scattered trees, and not associating, like most of our Pigeons, in flocks. Its note is exactly that of the European Turtledove. The natives are very fond of keeping them in cages. The nest is a mere platform, hardly concealed, and contains two white eggs.

Fam. TETRAONIDÆ.

115. COTURNIX CHINENSIS (Linn.), Blyth, Cat. p. 255. *Syncœcus sinensis.* (*Pipitkan.*)

An exceeding'y common bird in grassy places, where its note (of which its vernacular name is a perfect onomatopœia) may be constantly heard. In their habits these birds are perfect Partridges in miniature, associating in coveys, and rising all at once with the same kind of flight. They readily live and breed in confinement; but it is necessary to give them a very high cage, or to put a ceiling of cloth; otherwise, from their habit of constantly leaping up, they beat their heads bare to the bone. Their eggs are very large for the size of the bird, and are marked like those of our waterhen: the young, small as they are, run as soon as they are hatched. After having been once flushed, these Quails fly a short distance and are difficult to raise again, running with great rapidity among the grass. I have now about twenty of them in a large cage with upwards of a hundred other birds of various species; and they have become very tame, running among the fresh turf, with which they are supplied, like little mice.

Fam. PHASIANIDÆ.

116. ARGUS GIGANTEUS (Temm.).

The Argus Pheasant, called, from its note, "*Kuan*" in most Malay countries, is a bird of the most sequestered forest-country, and is rarely seen, though often heard in the night. I had this specimen alive, but it lived only a short time; it was caught in a noose.

Fam. CHARADRIIDÆ.

117. ÆGIALITIS GEOFFROYII (Wagl.).

From Tabanio.

[This appears to be the larger of the two species distinguished by Blyth, J. A. S. B. xii. p. 181.—P. L. S.]

118. ÆGIALITIS PHILIPPINUS (Scop.).

Procured by my hunter on the sea-shore at Tabanio, a little to the south.

119. CHARADRIUS LONGIPES, Temm. (*Sintar.*)

This Plover is a very common bird here, flying in large flocks, and especially frequenting the bare muddy places where buffaloes are in the habit of bathing. They are difficult to approach, except in a high wind, when they are very tame, and a large number may be shot at once as they rise. When disturbed, they usually perch on some bare stony spot; and by knowing this place, and walking to and fro between it and their feeding-ground, whither they return when again flushed, I have often made a good bag. They are excellent eating, and form a great item in our game-lists here.

Fam. SCOLOPACIDÆ.

120. TOTANUS HORSFIELDI, Sykes.

From the sea-shore at Tabanio.

[Determined by Mr. A. Newton, as were also the two following species.—P. L. S.]

121. TOTANUS AFFINIS, Horsfield. (*Junggit-batang.*)

A truly freshwater species, frequenting rivers, and perching on the "batangs" or large logs of drift timber, whence its name. These birds are frequently seen in small packs, probably families, and fly close under the banks of the river, with a jerking, uneasy flight.

122. TRINGOIDES HYPOLEUCUS (Linn.). (*Junggit-junggit.*)

I cannot refer this precisely to any of the species which I sent from Labuan.

Fam. ARDEIDÆ.

123. ARDEA PURPUREA (Linn.). (*Balakokan.*)

Here a very common bird in marshy places; its habits when

feeding, are exactly like those of our English *A. cinerea*. When gorged with food, it is very stupid, and allows a very near approach; and being very good to eat, as I can testify, great numbers are killed. It usually perches on a low tree or tuft of reeds, or often on a tall dead tree. In the evening they may often be seen flying at a great height, and in a steady straight course, as if bound for a long journey. The note is a deep harsh croak. The nests are either solitary or, at most, two or three together, and are built a few feet from the surface of the water, among tall reeds in almost inaccessible marshes. They are mere flat platforms of sticks; the eggs are light green, about the size of those of a goose, and three in number.

124. Herodias greyi, Gould, B. Austr. vi. pl. 61.

In fresh-water swamps near Martapora, generally seen perching on the tops of the reeds.

125. Butorides javanicus (Horsf.), Bp. Consp. ii. p. 130.

I suppose this bird derives its name, which means "shell-bird," from its food, as my hunter tells me the stomach is always full of broken shells.

126. Ardetta cinnamomea (Gm.). (*Bangan sambilan-kechil.*)

Procured by my hunter in the marshes near Banjermassing.

127. Nycticorax griseus (Linn.), Bp. Consp. ii. p. 140.

Shot by my hunter at Banjermassing.

Fam. Rallidæ.

128. Gallicrex cristata (Lath.), Blyth, Cat. p. 283.

Found here and there in marshy places: flies like a Land-Rail, when flushed.

129. Rallus gularis, Horsf. Linn. Trans. xiii. p. 196. (*Burok-Burok Peai.*)

Peai is the name of the *Acrostichum inæquale*, which grows in the marshes which this bird haunts.

This bird is very common here: it rarely or ever flies more than two or three yards at a time, and so is not often seen; but in the evening its note, resembling the loud croak of a frog, is heard in all directions in wet places.

130. Porzana phœnicura (Penn.), Blyth, Cat. p. 284. (*Burok-burok.*)

Not uncommon here, but difficult to procure. I have never seen it fly.

131. Porzana ——?

Sim. P. phœnicuræ, *sed minor, et fronte albo carens.*
Long. tota 8·0, alæ 5·0, tarsi 1·9 poll. Angl.

Fam. ANATIDÆ.

132. DENDROCYGNA ARCUATA (Cuv.).

This small Duck is very common here on the marshes. They are very wild and difficult to shoot, but excellent eating. Taken young, they become very tame, and breed in confinement, freely associating with other poultry; but they are excessively pugnacious, and tyrannize even over the geese.

Fam. LARIDÆ.

133. GELOCHELIDON ANGLICA (Mont.). (*Simbangan.*)

Of course a sea-bird, though shot in a freshwater marsh, where I had observed it some days flying over the water like a Swallow.

134. STERNULA MINUTA (Linn.).

Procured in the same place.

June 9th, 1863.

John Gould, Esq., F.R.S., in the Chair.

Dr. Sclater made some observations on some of the interesting species of animals he had seen during a visit he had just paid to the Zoological Gardens of Amsterdam, Rotterdam, and Antwerp. Amongst other species not yet received in this Society's collection, but of which examples were exhibited in the sister establishments, he called particular attention to

1. *Cervus equinus*—the Bornean Deer of the Rusine type, of which several specimens were in the Amsterdam Gardens, and which appeared readily distinguishable from the *Cervus rusa* of Java by its darker colour, shorter hair, and the stouter antlers of the male.

2. *Cervus kuhlii*—the smallest species of the same section of the genus, from the Bavian Islands.

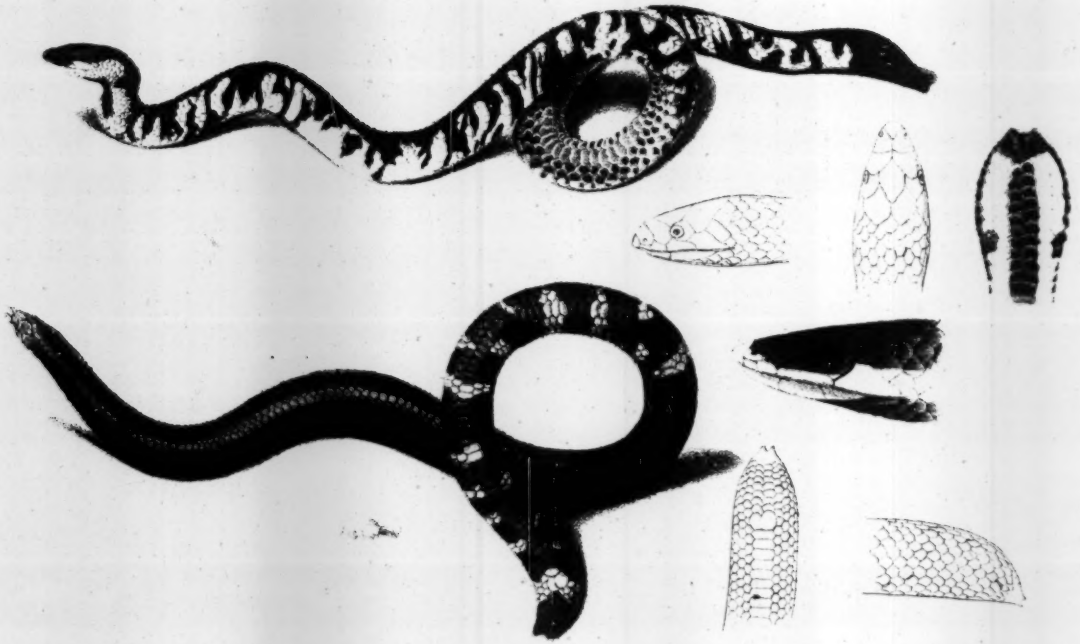
The Amsterdam Society now possessed both sexes of this little Deer, which was breeding with them readily. It resembled in size and general appearance *Cervus porcinus* of India, but was absolutely without spots, even in its youngest stage, and easily distinguishable in other ways.

3. *Cervus nemorivagus* of Surinam, of which he had succeeded in obtaining a pair from Mr. Westerman for the Society's Menagerie.

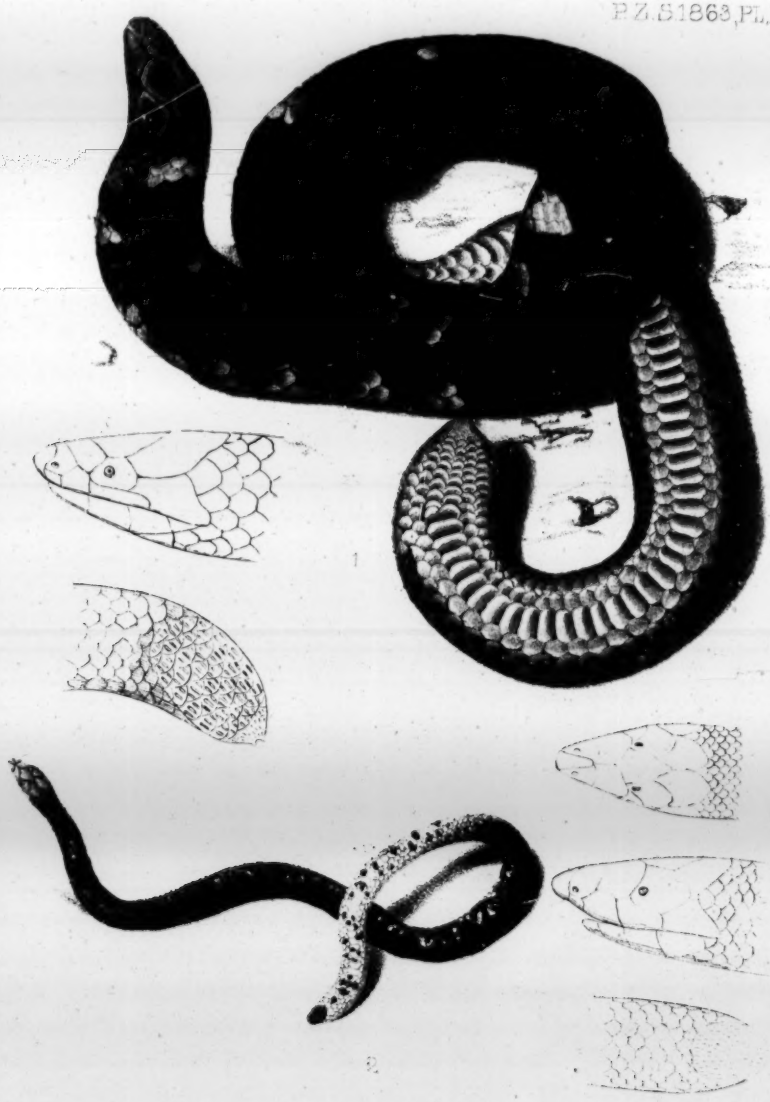
4. *Lagostomus trichodactylus*, a well-known American Rodent from the Pampas, of which he had seen a living example for the first time in Amsterdam.

5. *Cathartes urubitinga*, Natt. MS. (v. Pelz. Sitz. Wien. Ak.

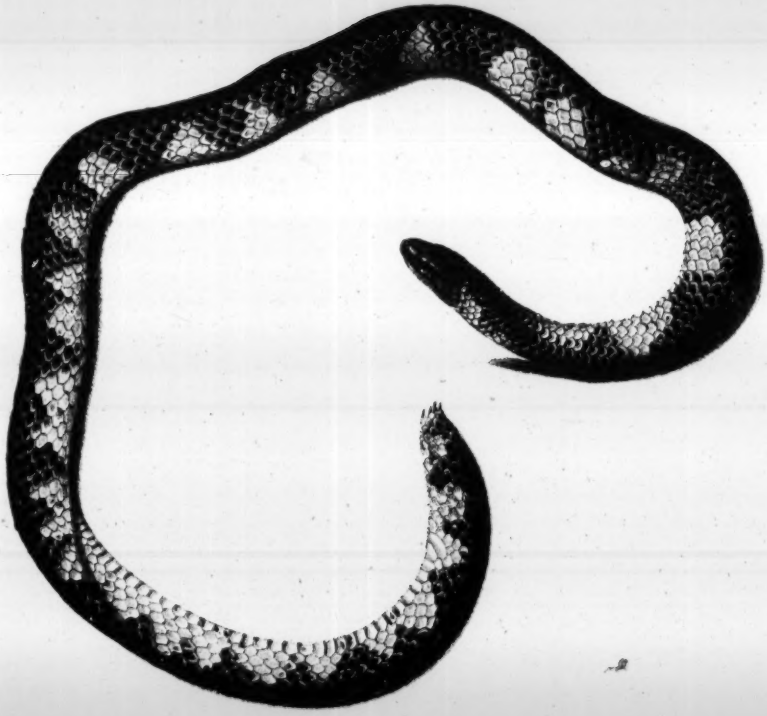
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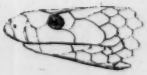
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J. Wolf lith.

M.& N. Hanhart imp.

1861, p. 7), a species very distinct from the Red-headed *C. aura*, being smaller in size, and having the naked skin on the head yellow —from Surinam, where the true *C. aura* was also found, specimens of both these species from that country being exhibited side by side in the Zoological Gardens at Amsterdam.

6. *Leptoptilus capillatus* (Temm.), a fine species of Adjutant from Java in the Amsterdam Gardens.

7. *Casuarius uniappendiculatus*, Blyth.—The example of this species, already spoken of at previous meetings of this Society*, was still living in fine adult plumage in the Amsterdam Society's Gardens.

8. *Felis aurata* (Temm.).—A specimen of this scarce and beautiful Sumatran Cat was in the Zoological Gardens at Rotterdam.

9. *Cervus schomburgki*, Blyth, P. Z. S. 1863, p. 155.—A Deer lately received by Mr. P. Martin, Director of the Amsterdam Gardens, from Siam, was perhaps the female of this new species of Mr. Blyth. Mr. Martin was making efforts to obtain the male.

10. *Tantalus ibis*.—A bird of this scarce species had been living for some years in the Antwerp Gardens. Dr. Sclater called attention to the fact that an individual of the same species in immature plumage had just been added to the Society's collection.

Mr. W. Williams of Tregullow communicated some observations upon the growth of the young West Indian Tortoises hatched in this country, as mentioned in the Society's 'Proceedings' for 1862 (page 266). The larger of the two young Tortoises on the 21st of May weighed nearly an ounce, and was about $4\frac{3}{8}$ inches in girth round the middle. The smaller of the two weighed exactly $\frac{3}{4}$ of an ounce, and measured about 4 inches in girth. The heat of the pine-pit in which they had been kept had varied from 65° to 70° Fahr. during the winter; as the spring advanced, the heat had ranged from 75° to 85°.

The following papers were read:—

1. DESCRIPTIONS OF NEW SPECIES OF THE FAMILY UROPELTIDÆ FROM SOUTHERN INDIA, WITH NOTES ON OTHER LITTLE-KNOWN SPECIES. BY CAPTAIN R. H. BEDDOME, OFFICIATING CONSERVATOR OF FORESTS, MADRAS.

(Plates XXV., XXVI., XXVII.)

Genus SILYBURA.

1. SILYBURA SHORTII. (Pl. XXV. fig. 1.)

Head-plates as in *S. brevis*, but vertical, 6-sided, and occipitals pointed behind; caudal disk very large and well-defined; scales very

* See Trans. Zool. Soc. iv. p. 359.

strongly 2–3-keeled; terminal scale large, slightly bicuspid. Scales of the body in 17 rows, on the neck in 19. Eye very large. Total length 9 inches. Colour blackish, with large dull yellowish white mottlings (the two colours nearly equally divided); tail beneath black, with a yellowish band on each side. Abdominals 134; subcaudals 10.

Shevaroy Hills (4500 feet elevation). Forwarded to me by Dr. Short.

2. SILYBURA OCELLATA.

Rostral pointed and much produced; nasal scutella meeting behind the rostral, and separating it from the frontals; eye very small, obscure, in front of ocular shield; other shields and labials as in the genus; scales round the neck in 18 rows, round the trunk in 17; caudal disk not very clearly defined; scales 2–5-keeled; terminal shield entire, or slightly 2–3-pronged; abdominals 199; subcaudals 8 or 10 pairs, some generally entire. Total length 14½ inches. Colour of the body of the male yellowish, becoming gradually brown near the head and tail, of the female dull brownish, of the young dark purplish brown; all banded with transverse rows of four or five black-edged white or yellow spots (like eyes), generally rather irregularly placed. Sides of the belly with transverse, very irregular-shaped, yellow or white blotches, rarely meeting over the abdominals, and forming a transverse band.

Walaghat, on the western slopes of the Nilgherries, at an elevation of 3500 feet, in the dense moist forests. I procured three specimens—male, female, and young.

3. SILYBURA BREVIS, Günther.

The specimen here figured only differs from the one described by Dr. Günther in having sixteen rows of scales instead of seventeen, and in the terminal scale of the tail being entire and not bicuspid.

I procured this specimen on the Nilgherries; the one described by Dr. Günther was found on the Anamallays.

4. SILYBURA NILGHERRIENSIS. (Pl. XXVI. fig. 1.)

Scales in 17 rows; anal large, bifid; subcaudals 9; snout obtuse: rostral far produced back between the nasals; nasals just meeting behind the rostral; vertical 6-sided, pointed in front and behind; eye rather large, in front of ocular shield; caudal disk well defined: scales very prominently 2–3-keeled; terminal scale ending in two points. Colour of the body of an indigo-hue, with small dull yellow blotches; belly dull yellowish. Length 17 inches; circumference 3 inches.

Ootacamund, Nilgherries, 7000 feet elevation.

This is by far the largest Earth-snake we have in Southern India.

It is possible that *S. brevis* may be the young of this species: they are, however, found at different elevations; and without intermediate forms I cannot venture to unite them, that being the smallest Earth-snake in our presidency, and this the largest. There is, however,

scarcely any difference in the shields of the head, though the head of *Silybura brevis* is broader.

5. SILYBURA BEDDOMII, Günther.

I have lately procured numerous specimens of this Snake on the Shevaroys, elevation 4500 feet. I have also found it in the Mudumallay Forest, elevation 3000 feet. The spots on the scales are yellow, turning white in spirits.

Note.—Silyburæ brevis, nilgherriensis, shortii, and *macrolepis* (a Ceylonese species) have a well-defined head, with broad snout and a large eye. *Silyburæ ellioti, beddomii,* and *ocellata* have a pointed snout and a small eye (as in the genus *Rhinophis*).

6. RHINOPHIS SANGUINEUS.

Scales of the body large, in 15 rows; of the anterior portion of the trunk sometimes in 17; rostral much produced, very sharp, conical, horny, produced back, and covering the conjunction of the nasals; nostril in front of nasal shield; eye very small and obscure, in front of ocular shield; four upper labials, 1st small, 2nd, 3rd, and 4th large; caudal disk nearly as long as tail, oblong, covered with excrescences, a red streak down the centre and one on each side. Colour of the body bluish black; belly bright red, with blackish mottlings; anal bifid; subcaudals of the male 9 or 10 pairs, each with 4 to 6 keels, and some of the approximated ventral plates and a few of the two lowest rows of scales also keeled; female subcaudals 6 or 7. Total length of large male 13 inches, female 10 inches; circumference 1 inch; abdominals 195.

The brilliant red colour of the abdomen fades in spirits.

I procured numerous specimens of this species at Cherambòdy in the Wynand (Malabar), elevation 3500 feet; they were all dug up in one spot. I have not met with it elsewhere.

7. RHINOPHIS MICROLEPIS. (Pl. XXVI. fig. 2.)

Scales of the body small, in 15 rows; of the anterior portion of the trunk in 17, of the neck in 19. Caudal disk oblong, orbicular, one-half the length of the tail, covered with excrescences, which are confluent into streaks; subcaudals 10; anal bifid; head-plates as in *R. sanguineus*, but rostral less sharp. Colour of the body greyish black, with indistinct dull yellowish white mottlings; belly yellowish white, with dark mottlings; tail beneath yellowish, with a broad black spot. Abdominals very small, 199. Total length 6 inches; circumference $6\frac{1}{2}$ lines.

I procured this (a solitary specimen) in the Wynand, elevation 3500 feet.

Genus PLECTRURUS.

* *Eye rather large, with a supraorbital shield.*

8. PLECTRURUS PERROTTETI, Gray, P. Z. S. 1858, p. 265.

This is most abundant on the tops of the Nilgherries, 7000 to

8000 feet; it is dug up in gardens, and found under the turf and under stones. My largest specimen is 14 inches long; it rarely, however, attains that size: the one figured is the usual size of the adult.

9. PLECTRURUS GUENTHERI. (Pl. XXVII.)

Scales of the neck in 17 rows; anterior portion of the trunk in 13 rows, of the rest of the body in 15 rows; head-shields as in *P. perrotteti*, only the rostral is not produced so far back. All the scales of the tail 5–6-keeled, and some of the approximated scales of the body also keeled; terminal scale of the tail with four sharp points, and covered with small tubercles; abdominals 172, and a bifid anal; subcaudals 12. Total length 13 inches, circumference $1\frac{3}{8}$ inch. Colour of the body of a bright reddish purple; belly yellow, the yellow colour rising up on the sides of the trunk into regular pyramid-shaped markings, and the purple colour descending in the same way down to the abdominals.

I procured this very fine species in the moist forests at Walaghat, on the western slopes of the Nilgherries (3500 feet elevation). I have great pleasure in naming it after Dr. Günther.

** *Eye small, no supraorbital shield.*

10. PLECTRURUS WYNANDENSIS.

Scales round the body 15, round the neck 16 or 17; rostral scarcely produced back between the nasals; *no supraorbital*; muzzle more obtuse than in *P. perrotteti*; *eye small*; subcaudals 11 pairs; anal large, bifid; tail compressed; scales smooth, terminal spinose, tail ending in a single horny point. Colour bluish black, with broad white blotches on the belly, which become larger and more numerous towards the tail; tail uniform bluish black.

Wynand, elevation 3500 feet.

11. PLECTRURUS PULNEYENSIS. (Pl. XXV. fig. 2.)

Rostral rather obtuse, produced back between the nasals, and touching the frontals, nasals not meeting; *eye small*, in front of the ocular shield; *no supraorbitals*; vertical 6-sided; occipitals rounded behind; 4 upper labials. Scales round the neck 19, round the body 17; subcaudals, male, about 12, female 6–8. Tail compressed, ending in a small spinose keel, more or less bicuspid. Scales of the tail all smooth. Colour uniform earthy brown; a lateral bright yellow streak from the labials continued on each side of the trunk, about 1 inch or $1\frac{1}{2}$ inch in length; a few minute yellow specks on the back; belly with broad bright yellow transverse bands, very irregular as to number and shape; yellow markings about the vent and tail.

Very abundant on the Pulney Hills, 7000 to 8000 feet, where it takes the place of *P. perrotteti* of the Nilgherries; in habits, &c. exactly the same as *P. perrotteti*.

The very brilliant yellow fades in spirits.

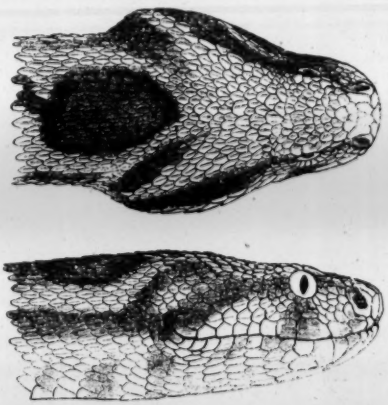
These last two species differ from the typical form of this genus in their much smaller size and in the absence of a supraorbital shield. As, however, they have the same compressed tail, I prefer keeping them in this genus to making a new genus for them.

2. On a Species of Vipera hitherto unknown. By E. D. Cope.

VIPERA CONFLUENTA, sp. nov.

Head much longer than broad, covered with small scales, which are more or less keeled as far anterior as the postfrontal region. Superciliaries little developed, once or many times divided. Scales of the upper surface of the muzzle larger; a well-developed supranasal. Prenasal large, erect, undivided; postnasal developed in front of, and narrowly superior to, the nostril. Three rows of scales between the orbits and the superior labials. The latter are eleven in number, the fourth longest, the first in contact with the prenasal. Rostral higher than broad. Inferior labials fourteen, fifth largest. Scales of the body in 25 rows, all keeled, never spiniferous. Gastrosteges 180; urosteges 48. Length from muzzle to rictus $1\frac{1}{4}$ inch, from muzzle to vent $30\frac{1}{2}$ inches, from vent to end of tail $4\frac{2}{3}$ inches.

General ground-colour brownish yellow; belly paler. A broad undulating brown band, resembling a confluence of alternate rounded spots, extends from the nape to the end of the tail. A dark brown lateral streak, which is interrupted at regular intervals, extends



throughout the greater part of the length. Labial regions yellowish; a brown band from orbit to angle of mouth; a brown spot below orbit.

The habitat of this species is not known, but is probably Africa. Its nearest ally is the *V. libitina*, with which it forms a section of the genus characterized by a superciliary plate more or less subdivided, and leading off to *Echidna*. In the writer's opinion, the genus *Vipera* is to be separated from *Echidna* by its large prenasal plate, and postnasal slightly developed above the nostril, which is always lateral: in *Echidna* the prenasal is replaced by scales, and the postnasal is much developed above the nostril, which is usually vertical; in *E. atropus* the nostril is vertico-lateral.

One specimen of this *Vipera* belongs to the Academy of Natural Sciences of Philadelphia, and another is in the British Museum. For an opportunity of examining and figuring the latter, my acknowledgments are due to the distinguished officers of the institution, Drs. Gray and Günther.

3. Record of the Period of Gestation of certain Ruminants which breed in the Society's Gardens. By P. L. Sclater, M.A., Ph.D., F.R.S., etc., Secretary to the Society.

The period of gestation of certain animals of the class of Ruminants which habitually breed in the Society's Menagerie has been ascertained with tolerable exactness. Of course the period is slightly variable; but the times given in the following list are, on the average, very faithfully adhered to.

Fam. Cervidæ.

Wapiti Deer (*Cervus canadensis*)	8 months.
Persian Deer (*C. wallichii*)	
Barasingha Deer (*C. duvaucelii*)	
Japanese Deer (*C. sika*)	
Sambur Deer (*C. aristotelis*)	
Rusa Deer (*C. rusa*)	
Hog Deer (*C. porcinus*)	
Axis Deer (*C. axis*)	

Fam. Camelidæ.

Lama (*Auchenia glama*)	11 months.
Alpaca (*A. pacos*)	

Fam. Camelopardidæ.

Giraffe (*Camelopardalis giraffa*)	15 months.

Fam. Bovidæ.

Punjab Wild Sheep (*Ovis cycloceros*)	4 months.
Moufflon Sheep (*O. musimon*)	
Leucoryx Antelope (*Oryx leucoryx*)	8 months.
Eland Antelope (*Oreas canna*)	9 months.
Nylghai Antelope (*Portax picta*)	Between 8 and 9 months.

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J. Wolf del. et lith.

M&N Hanhart imp.

GALAGO MONTEIRI.

The Hippopotamus has never bred with us; but I may state that the period of gestation in this animal is known to be short. The female in the Amsterdam Gardens, which has twice produced young in that establishment, went only 7 months and 16 days on the first of these occasions, and 7 months 20 days on the second.

4. Description of a New Species of Galago.
By A. D. Bartlett.

(Plate XXVIII.)

In the month of November last I had occasion to call at the house of Mr. L. A. Monteiro, and that gentleman showed me the animal now before you. I at once told him that the animal was new and unknown to me. Since that time I have taken every opportunity of ascertaining if I was right in so saying; and this morning I called again upon Mr. Monteiro, who kindly lent me the animal, with permission to exhibit and describe it this evening. I at once proceeded to the British Museum to compare this animal with the species in that collection; but nothing like this specimen is to be found there. I have also the opinion of Dr. Gray (who has for some time devoted much attention to this group of animals), who kindly assisted me in this examination, and stated that he believed the animal to be unknown and undescribed. It differs from the known species in being larger and lighter in colour and in having a much longer tail. Mr. Monteiro informs me that it was sent to England by his son, Mr. J. J. Monteiro, who obtained it at Cuio Bay, to the south of Loando, in Angola. It is very gentle, and sleeps much during the day, feeds on *fruit, bread, milk,* and other sweet things, particularly bananas.

The entire length of the animal is 28 inches, of which the tail measures 16 inches.

The colour is light chinchilla grey all over the head, body, and tail, nearly white on the throat; the toes and feet dark brown, nearly black; nose black; the eyes greyish brown; the ears nearly black, 2 inches long, $1\frac{1}{2}$ inch broad at the base. The animal has the power of turning its ears back and folding them up when at rest. When moving about or in search of food, they spread out and stand upward and forward, reminding one of the Aye-Aye; but when folded back and down, the animal's face bears a strong resemblance to the Douroucouli. The pupils of the eyes are oval and vertical.

This animal is considerably larger than the specimen in the British Museum, known as *Otolicnus crassicaudatus*; but as I am unable to determine the exact structure of its teeth, in order to say positively that it belongs to that genus, I propose to name it *Galago monteiri*, in order to identify it with the gentleman who has added from time to time many rare specimens to our collection.

5. On a Collection of Birds from Central Australia. By John Gould, F.R.S., etc.

The Board of Governors of the South Australian Institute having liberally forwarded for my inspection a selection from the ornithological collection made by Mr. Frederick G. Waterhouse during Mr. Stuart's late Exploratory Expedition into Central Australia, I have thought the matter of sufficient interest to bring these birds under the notice of the Society, the more so as it will enable me to make known through our 'Proceedings' a new and very beautiful species of Parrakeet pertaining to the genus *Polyteles*, of which only two have been hitherto known. Every ornithologist must be acquainted with the elegant *P. melanurus* and *P. barrabandi*, and I feel assured that the acquisition of an additional species of this lovely form will be hailed with pleasure. The specific appellation I would propose for this novelty is *alexandræ*, in honour of that Princess who, we may reasonably hope, is destined at some future time to be the queen of these realms and their dependencies, of which Australia is by no means the most inconspicuous.

Polyteles alexandræ, sp. nov.

Forehead delicate light blue; lower part of the cheeks, chin, and throat rose-pink; head, nape, mantle, back, and scapularies olive-green; lower part of the back and rump blue, of a somewhat deeper tint than that of the crown; shoulders and wing-coverts pale yellowish green; spurious wing bluish green; external webs of the principal primaries dull blue, narrowly edged with greenish yellow, the remaining primaries olive-green, edged with greenish yellow; under wing-coverts verditer-green; breast and abdomen olive-grey, tinged with vinous; thighs rosy red; upper tail-coverts olive, tinged with blue; two centre tail-feathers bluish olive-green; the two next on each side olive-green on their outer webs and dark brown on the inner ones; the remaining tail-feathers tricoloured, the central portion being black, the outer olive-grey, and the inner deep rosy red; under tail-coverts olive; bill coral-red; feet mealy brown.

Total length 14 inches; bill $\frac{1}{2}$; wing 7; tail 9; tarsi $\frac{7}{8}$.

Habitat. Howell's Ponds, Central Australia, 16° 54′ 7″ S. l.

Remark.—This is in every respect a typical *Polyteles*, having the delicate bill and elegantly striped tail characteristic of that form. It is of the same size as *P. barrabandi*, but differs from that species in having the crown blue and the lower part of the cheeks rose-pink instead of yellow.

The following is a list of the other species of birds comprised in the collection:—

Trichoglossus rubritorquis. Rare.
Aprosmictus erythropterus.
Platycercus brownii. Rare.
Struthidea cinerea.
Climacteris melanura.

Pomatorhinus rubecula. Rare.
Cinclorampus cruralis.
Artamus leucopygialis.
—— *cinereus.* Rare.
Colluricincla brunnea.
Petroica bicolor.
Pardalotus rubricatus. Extremely rare; the second specimen seen.
Graucalus melanops.
Tropidorhynchus argenteiceps.
Geopelia cuneata.
—— *humeralis.*
Erythrogonys cinctus.

6. Notes on the Method of Incubation among the Birds in the Order Struthiones. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

The phenomena of reproduction in the two families *Struthionidæ* and *Apterygidæ*, which compose the order Struthiones, as far as we are acquainted with them, appear to be very distinct. In the *Struthionidæ* the females deposit numerous eggs. These are collected together by the male, who takes the whole duty of incubation upon himself, and likewise tends and looks after the young birds when hatched. In the *Apterygidæ* it would appear that the female deposits but one single egg, and sits upon it herself. This I judge to be the case from the following evidence, which is all I have been able to collect upon the subject:—

1. The Ostrich (*Struthio camelus*).

I shall not repeat the numerous stories that are universally current respecting the reproduction of the Ostrich. It is generally supposed to lay its eggs in the desert, and to leave them to be hatched by the heat of the sun; and this belief appears to have been current ever since the Book of Job (one of the earliest of the Holy Scriptures) was written. But we know now with certainty, from the observations* of M. Noel Suchet, Director of the Zoological Gardens at Marseilles, that the normal habits of the Ostrich on this point do not differ materially from those of its allies of the same family. In March 1861 a pair of Ostriches were placed in a quiet enclosure near Marseilles for the purpose of inducing them to breed. Fifteen eggs were deposited by the female, in an excavation made in the sand by the two birds working alternately, at intervals of two days each, the number being complete on April 20th. The male then took up his position on the eggs, and the young birds were hatched on the 3rd of June, being forty-five days after incubation had commenced. This, however, would appear to have been before the expiration of the usual period of incubation, which, according to the observations of M. Hardy of Algiers, lasts usually from fifty-six to sixty days.

* See Rev. Zool. 1861, p. 467, and Bull. Soc. Acel. 1861, p. 142.

2. The Rheas (*Rhea americana* and *R. macrorhyncha*).

The little male *Rhea* upon which I have founded my species *R. macrorhyncha* has been associated in the Gardens for the last two years with a female of the common species, *R. americana*. Last year the pair bred in the Gardens for the first time—the male making the nest, arranging the eggs, and performing the whole duties of incubation. Two young birds were reared, which are still living in the Gardens. This year the male bird commenced to sit on the 8th of May, at which time there were only two eggs in the nest. The female, however, continued to lay, and there are now twelve eggs. The eggs of the Rheas hatched in the incubator required thirty-five days, or five weeks, to hatch; and, as far as we can make out, this appears to be about the normal period of incubation. Other instances have occurred of the *Rhea americana* breeding in this country, in which the same course has been pursued.

3. The Cassowaries (*Casuarius galeatus* and *C. bennettii*).

The Common Cassowary of Ceram (*Casuarius galeatus*), though it frequently deposits eggs in captivity, has never, I believe, been known to breed. Birds of this species, even when of different sexes, are usually very savage, and cannot safely be placed together. But the pair of Mooruks (*C. bennettii*) which we received from Australia in 1858 have been successfully brought together, by the care and skill of our excellent keeper, Michael Scott, and have last year and again this year bred in our Gardens. The male in this bird, again, performs the duties of incubation, the female not interfering in the matter. Last year, after an incubation which lasted seven weeks, a single young one was hatched on the 4th of September, which was unfortunately destroyed by rats the same day. This year the male commenced to sit on the 25th of April on six eggs, and we hope to be more fortunate.

4. The Emeu (*Dromæus novæ hollandiæ*).

The Emeu has bred several times in our Gardens, and at other places in this country. It is well known that the male bird of this species also performs all the incubatory duties. An interesting account of the breeding of the Emeu has been published in the 'Zoologist' for January last, by Mr. William Bennett, where full particulars will be found relating to this subject. The period of incubation in the Emeu appears to be eight weeks.

5. The Kiwi (*Apteryx mantelli*.

The *Apteryx* is so scarce a bird, even in New Zealand, that it can hardly be expected that we should be well acquainted with its mode of reproduction. H. E. Sir George Grey has lately sent me the following extract from a letter addressed to him by F. E. Manning, Esq., dated Hokianga, on the north-western coast of the Northern Island, February 2nd, 1863:—

"Several years ago an old native, who had been a great Kiwi-hunter in the times when the Kiwi were plentiful, told me a strange

tale about the manner in which the Kiwi hatches its eggs. I, of course, cannot vouch for the correctness of the story, but think it worth mentioning; he said that the Kiwi did not sit like other birds *upon* the egg, but *under* it, first burying the egg in the ground to a considerable depth, and then digging a cave or nest under it by which about one-third of the lower end was exposed, and so lying under the egg and in contact with the lower end which came, as it were, through the roof of the nest or burrow. The appearance of the egg which I propose to send corroborated this statement; for two-thirds of its length (the small end) was perfectly clean and white, and about one-third (the large end) was very much discoloured and very greasy, evidently from contact with the body of the bird. The difference in the colour and condition of the ends of the egg was quite remarkable, and well defined by a circular line passing round the egg. I am sorry now that I caused the egg to be washed, but did not at the moment remember the story told me by the native."

Mr. E. L. Layard, who has lately returned to the Cape from New Zealand, has favoured me with the following information on the same subject, forwarded to him by Mr. Webster, also resident at Hokianga, which contains much more positive information.

Mr. Webster writes as follows, respecting the Kiwi:—"A fortnight ago a native, out shooting Pigeons, discovered a Kiwi's egg protruding out of a small hole at the root of a Kauri-tree; removing the egg, he put his arm, to the elbow, up the hole, and got hold of the parent bird. The egg and the bird I have secured. Does it not appear a strange position for the egg to be in?

"An old native, who professes to know something about them, states that they lay but one egg at a time. The nest is merely a hole scraped out by the bird, and generally about the roots of a tree, where the ground is dry; the egg is covered with leaves and moss, the decomposition of which evolves heat sufficient to bring forth the young. The process takes six months. When hatched, the mother, by instinct, is at hand to attend to her offspring."

Fortunately we are able to test these statements to a certain extent by the observations of the habits of the female *Apteryx mantelli* in our Gardens, which, although unmated, has for several years produced eggs.

The *Apteryx* laid her first egg on the 9th of June 1859, as I have already recorded in these 'Proceedings.' Since then she has laid nine others, generally producing one early in the year, and the second about three months after the first, altogether two eggs in each year. She has more than once manifested a disposition to sit upon her egg, having been discovered, after its deposition, placed *above* it, just in such an attitude as would be assumed if this were the case, and resisting all attempts to move her from her position. It would appear probable, therefore,

1. That the *Apteryx* lays one egg only at a time.
2. That this is deposited within a hollow tree, as recorded by Mr. Webster, and that the female incubates thereon.
3. That the *Apteryx* breeds twice a year.

7. Description of a New Lizard obtained by Mr. Henry Carter on the South-east Coast of Arabia. By Dr. J. E. Gray, F.R.S., etc.

(Plate XX.)

Mr. Carter, so well known for his researches on the Foraminifera, Sponges, and Microscopic Vegetables of India, has lately sent us, with a series of his different species of *Spongilla* of India, three dried Lizards from the south-east coast of Arabia. One of these is a young *Uromastix*; the others belong to an aberrant form of Geckoid Lizards, distantly allied to *Phyllurus*, which has not before occurred to me, and which we certainly have not in the Museum Collection. It is peculiar for having its tail flattened horizontally, and fringed on each side with linear elongated spreading scales. The scales of the body are minute and uniform in size. I propose to call this genus

Spatalura.

Head short, high. Nostrils oblong, transverse, on the upper surface of the nose, just above the labial shields. The eyes large, with a slightly projecting scaly ridge above, separated from the orbit, and forming a kind of shade. Ears open, deep. Labial shields distinct, few, about eight on each side; the rostral formed of a pair of shields; the chin-shield single, like the rostrals. Head, body, and limbs covered with uniform small granular scales; femoral and preanal pores none. Limbs elongate, slender. Foot elongate. Toes elongate, compressed, very slender; the upper side with distinct cross plates; the sole with granular scales. Tail slender, oblong, depressed, not so long as the body, covered above and below with scales similar to, but rather larger and more keeled than, those of the body, and with a fringe on each side of crowded, elongated, slender, linear scales, with some smaller ones at their base.

This genus differs from all the other naked slender-toed Geckoid Lizards in the form of the tail; and it is also remarkable among these animals for the uniform granular character of the scales, the height of the head, and the slenderness of its legs and feet, which give it much the external appearance of some of the species of *Anolis*, which are without any dorsal crest; but it is easily known from them by the large-sized open eyes, destitute of any eyelids.

Spatalura carteri. (Pl. XX., fig. 2.)

Pale grey (dry from spirits) above, whitish beneath; belly of one (male?) orange; central part of the back, forearm, and shanks varied with square white spots; sides with numerous narrow, black-edged, yellow streaks, which are closer together and more visible on the hinder part of the body.

Hab. Island of Massera, on the eastern coast of Arabia.

I have great pleasure in naming this beautiful species after Mr. Carter, who has laboured so successfully in extending our knowledge of many obscure Indian animals and plants.

Mr. Carter observes, "The two Lizards of a lavender or light lead-colour, with nearly invisible brown spots or lines, were caught in the island of Massera, which is about forty miles long, barren, and situated close to the shore of the south-east coast of Arabia, towards its easternmost end.

"The tail of one has dropped off. To the best of my recollection, it was not bushy or crested, like that of the one which remains on; and that at the time made me think the latter was the male, and the other the female of the species.

"It is just possible they may be new; for Massera is little known, and I think we (the surveying people) were the first white men who were ever on the island."

Most probably the tail of the second specimen, which was lost, might have been reproduced, and thus without the lateral fringe.

"The channel on the inner side of the island swarms with the Edible and Hawk'sbill or Turtle-shell Turtle; and the island is bestrewn with the bones of the former: for the inhabitants are all mere brutes (Anthropophagi and Ichthyophagi)."

This genus of *Geckoidæ* has many characters in common with the *Agamidæ*. Like *Eublepharis* it has a large circular pupil to the eye, and in this respect they form together an aberrant group of the family. In both these genera the pupil is large as well as circular. It is also peculiar, among the Geckoids, for the scales being all of a uniform size and character; but this is found in a few other species, such as *Boltanea sublævis*, where the minute sublenticular scales are often almost entirely wanting.

"The Prickly-tailed Lizard, of a light-brown colour, was caught on or close to the town of Makulla, a port on the south-east coast of Arabia.

"I regard it as the young of a species just like it, which grows to a foot or more in length, on the coast mentioned."

This is very nearly allied to *Uromastix spinipes*; but unfortunately the specimen is too young and not in a sufficiently good condition to determine if it is absolutely the same.

June 23, 1863.

Dr. J. E. Gray, F.R.S., V.P., in the Chair.

Prof. Huxley, F.R.S., read a communication* on the form of the placenta in the Cape Hyrax (*Hyrax capensis*).

Prof. Rolleston read a communication* on the form of the placenta in the Tenrec (*Centetes ecaudatus*).

Mr. R. Swinhoe exhibited a skin of a Royal Tiger (*Felis tigris*) killed in the vicinity of Amoy, China.

* These papers will be printed in the Society's 'Transactions.'

The Secretary read the following letter addressed to Dr. Gray by Mr. L. A. Monteiro relating to the habits of *Cynocephalus anubis*:—

"29 Harewood Square, N.W.,
June 1863.

"Dear Sir,—In fulfilment of my promise, I beg to hand you the following notice, as the substance of what my son Joachim J. Monteiro has written to me upon the two Apes, *Cynocephalus anubis* male and female, presented by him to the British Museum.

"It seems that the aspect of their native place or habitat about Cuio Bay, in Angola (a Portuguese possession on the western coast of Africa), is very different from that in which other Monkeys on that coast are placed, and, as he thinks, even different from the rest of the world, the difference being in the great scarcity of vegetation and the absence of water.

"The geological formation seems to be gneiss; the littoral region a narrow belt of gypsum and limestone rocks. The whole distance of fifty or sixty miles inland is hilly, and cut up in all directions by deep, dry, and solitary gullies and grand rocky ravines.

"The vegetation is restricted to dry prickly shrubs, a few roots of grass, and certain species of thick club-stemmed dwarf shrubs, all bearing a few leaves only during the few months of the year in which rain falls; the rest of the year nothing is seen but dry rock and leafless firewood, scorched and burnt month after month by the constant tropical sun. At distances far apart, brackish water is sparingly obtained by Zebras, these Monkeys, and other animals, by excavating holes in the sand at the bottom of the gullies.

"The principal food of these Apes is the root and stem of the thick tuber-rooted shrubs [*Welwitschia*?] above mentioned. Part of the root of these plants grows above the surface of the ground; and these Monkeys gnaw it off as a sheep does a turnip or mangel-wurzel, their dog-like elongated jaws and perhaps dentition appearing to him specially adapted to this manner of feeding.

"They are gregarious: he once counted fifteen together; and a few days previously to his writing, not less than thirty to forty came down to drink at a well he had opened at the copper-mines. He was then engaged in exploring at about four miles inland from Cuio Bay. Two were captured alive at Equemina, a place twelve miles south.

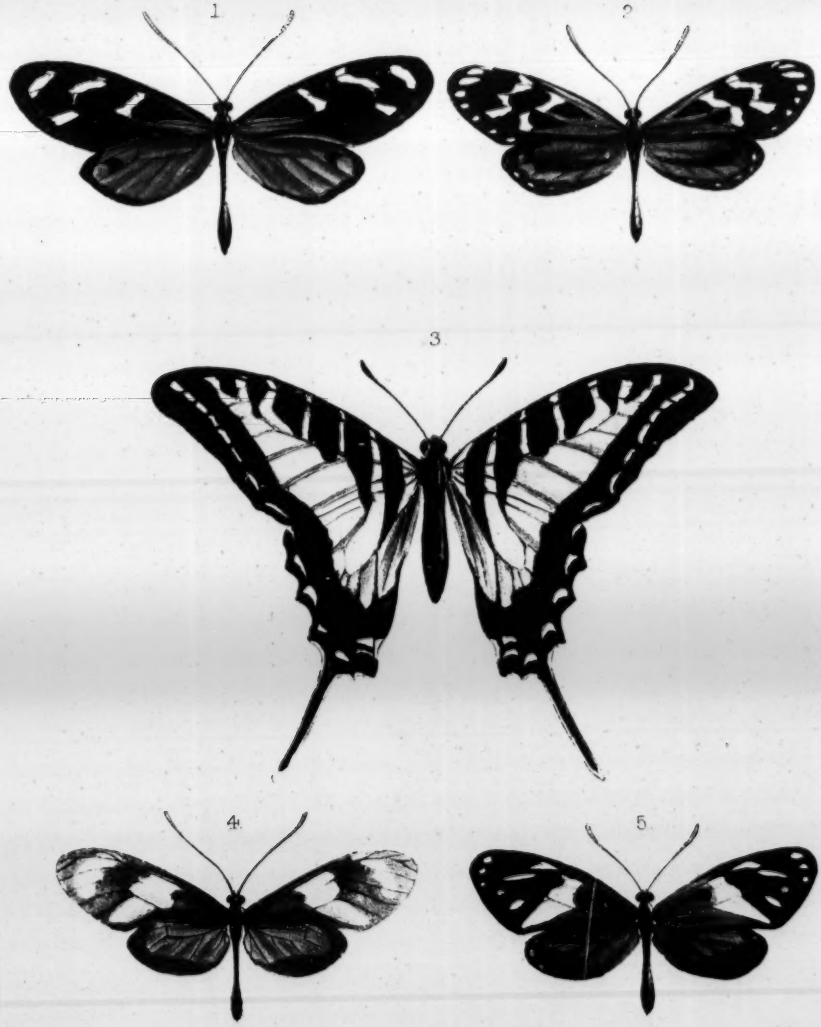
"They run very fast, on all fours, in a kind of sideway gallop, the young ones holding on to the backs of the dams.

"It seems that he had not been able to ascertain exactly their geographical distribution either in longitude or latitude from the bay, though he believes it does not reach northward of the River Quanza.

"It perhaps deserves to be mentioned that in the vicinity of the rivers in that part of the coast the vegetation assumes a more luxuriant character; but these rivers being but few and far apart, this does not alter the dry, bare character of the country where these Monkeys abound.

"The natives and Portuguese about these parts affirm that a troop of these Monkeys is always preceded by several scouts, which communicate by signals either danger or safety to the rest, and that these

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E.W.Robinson del. W.West imp.

1 Mechanitis isthmica. 2 Ithomia (Ceratinia) leucania. 3 Papilio xanticles.
4 Dircenna callipero. 5 Ithomia iphianassa, var panamensis.

scouts are set upon and punished if any mistake is committed by them.

"The two sent by my son were hunted down by the blacks with dogs, and killed with sticks.

"I remain, with consideration,
"Dear Sir,
"Your most obedient Servant,
"L. A. MONTEIRO."

"*Dr. J. E. Gray, F.R.S.*"

The following papers were read:—

1. ON A COLLECTION OF BUTTERFLIES BROUGHT BY MESSRS. SALVIN AND GODMAN FROM PANAMA, WITH REMARKS ON GEOGRAPHICAL DISTRIBUTION. BY H. W. BATES.

(Plate XXIX.)

Besides the rich ornithological and herpetological booty obtained by Messrs. Salvin and Godman during their recent tour in Central America, a large collection of Butterflies was made in different parts, chiefly, however, on the Atlantic and Pacific sides and in the central valleys of Guatemala. Having always a philosophic aim, these gentlemen were careful to keep the collections made in different districts separate, and also to note the vertical and horizontal ranges of the species: the gathered material, therefore, gives promise of furnishing important data in illustration of various questions connected with geographical distribution, such as the range of closely allied species and varieties and its dependence or not on physical barriers, the relations of the fauna to those of other neotropical regions, and so forth—questions which insects, and especially Butterflies, seem well adapted to illustrate. I hope to be able, with the permission of Messrs. Salvin and Godman, to examine and report upon the results of their entomological labours, devoting a paper to the collections of each district. The present notice is confined to a separate small collection obtained on the Isthmus of Panama, in the low forest-country situated about ten miles from the railway terminus on the Gulf of Mexico.

Although the Panama collection contains but thirty-one species (seventy-six specimens), it is very interesting as showing the close relation of the fauna to that of New Granada, and as adding to the proof that this north-western part of South America constitutes quite a distinct province as far as its land-fauna goes, having a considerable proportion of species peculiar to itself and a general specific dissimilarity from the adjoining region of Guiana (or the Guiano-Amazonian province), to which it has hitherto been united*. My own nearly complete collection of the species inhabiting the plains of the Amazons enables us to arrive at a tolerably accurate conclusion on this point.

* Woodward's 'Recent and Fossil Shells,' map.

Thus, if we withdraw those species, twelve in number, which (being found in open situations, generally in the suburbs of towns, and possessing large powers of dissemination) are widely distributed in Tropical America, an analysis of the collection yields the following results:—

Species not found in the Guiano-Amazonian region (six of which are new)	15
Species found in the Guiano-Amazonian region, but not extending their range further southward	4

Of the twelve generally distributed neotropical species, four present themselves in the form of tolerably well-marked varieties which seem to be peculiar to Panama and Central America. It may also be added that one of the four species which extend to the Guiano-Amazonian region reaches no further than the western part of the Amazons plains. The six new species contained in the collection are all more or less nearly related to New Granadian and Guianian forms, except one (*Papilio xanticles*), the nearest relative of this *Papilio*, from which, however, it is well distinct, being a Mexican species.

It may perhaps be premature to draw any inferences from these data bearing upon the former physical condition and changes of these regions, seeing that a much more extensive basis of facts is required, which can only be obtained by an analysis of the whole Columbian fauna; but it may be useful to point some of them out as an incitement to further research. For instance, as a large amount of peculiarity in the existing fauna of any land-area must prove that its inhabitants have not, geologically speaking, recently migrated to it, such area must be the site of a land of high geological antiquity. Moreover, as the productions which furnish these data are species belonging to genera and groups which inhabit only the low, warm, and humid forests of Tropical America, this ancient land must have always possessed districts supplying these same physical conditions. It cannot at present be decided how far this land extended to the south, as our knowledge of the productions of Eastern and Central Peru and Bolivia is at present very limited; but towards the north, the considerable change of species seen in Southern Mexico, which possesses districts very similar in physical conditions to many in Columbia, would seem to show that there was formerly a separation between the two regions, in the same way as the great dissimilarity between the faunas of Columbia and Guiana would show this to have been the case between these two now continuous lands. This latter conclusion, however, must be drawn with great caution, as a diversity of fauna between adjoining areas, even although their physical conditions may appear to us almost identical, does not necessarily prove the existence of a former physical barrier between them; for I found in the alluvial forest-plains of the Amazons that different small areas continuous with each other contained each their separate representative species, proving that some other cause besides physical barriers operates to limit the ranges of species.

1. PAPILIO XANTICLES, n. sp. Pl. XXIX. fig. 3.

♂. Wings above with a broad outer border brownish black; the rest of their surface pale ochreous, the ochreous portion crossed by six, mostly very short, brownish-black stripes, namely, one near the roots, broadish on the fore wings, but continued as a thin line on the hind wings to the posterior border near the anal angle; a second rather broader reaching only to the outer edge of the cell of the hind wings; three short stripes extending from the costa to the median nervure of the fore wings, the last of which covers the end of the cell; and lastly, a sixth similar but shorter one beyond the cell. The black border is, besides, traversed in its whole length by a row of ochreous lunules running nearly parallel to the outer margin, the anal lunule of the hind wings being double; there is also a short, narrow, oblique, bright red line near the anal angle. Tails long and linear, brownish black, narrowly margined throughout with ochreous.

Beneath, the same, except that the second black stripe on the hind wings has in the middle a narrow bright red line, which, commencing at the costa, is at first strongly flexuous, and then becoming straight continues to the outer border of the wing, that there are three grey lunules near the anal angle, and that the dark border has an indistinct pale line besides the row of lunules.

Body and antennæ black; head, thorax, and abdomen with an ochreous stripe on each side. Expanse 3″ 10‴.

This species, of which there are five examples, belongs to the same cosmopolitan section of the genus to which the European *P. podalirius* appertains, and to the minor group of which the North American *P. ajax* may be considered the chief member—a group which apparently does not extend to South America, the cluster of species of which it consists inhabiting extratropical North America, Mexico, and the West India Islands. *P. xanticles* is distinguished from the North American and West Indian species by the strongly flexuous red line of the under surface of the hind wings; in this feature it agrees with *P. philolaus*, a common Mexican and Guatemalan species, and with *P. arcesilaus**. It is, however, quite distinct from both in the colours and pattern of the wings, and forms an interesting addition to the South American species of this fine genus.

2. PAPILIO PROTESILAUS, Linn. et auct.

Var. *macrosilaus*, Boisduval, MS.

P. protesilaus under its typical form ranges from the south of Brazil to Guiana, and westward to the end of the Amazonian plains. In the valley of the Magdalena a very large form of it occurs, which, although differing in nothing except size from its type, has received a separate name. This fine variety seems quite to take the place of the true *P. protesilaus* at Panama, as all the specimens (four) contained in the collection belong to it. They differ, however, from examples

* This species is known only from the figure and description given by Lucas (Rev. et Mag. Zoologie, 1852, p. 131, pl. 10. f. 2. Its locality seems doubtful, as Lucas gives simply the vague one of North America.

from the valley of the Magdalena in having the inner row of pale lunules of the border of the hind wings much enlarged, and of a rich buff-colour, instead of the ground-colour of the wing, and also in the sides of the head and prothorax being of the same hue.

3. PAPILIO POLYCAON, Cramer et auct.

An example contained in the collection does not differ in the least from specimens obtained in the Amazons region and at Bahia, South Brazil.

4. PAPILIO ILUS, Fabricius.

Papilio ilus, Fabr. Ent. Syst. iii. 1. p. 17, no. 51.
P. hostilius, Felder, Lepid. Nov. Columbiæ, no. 5.

Two Panama examples agree precisely with the description given by Fabricius seventy years ago. As the species is not found in Guiana, Brazil, or the recently explored parts of Venezuela and New Granada, it has not been seen by subsequent writers on the genus, and two other quite distinct forms have been made to bear the name. The insect recently described by Dr. Felder from specimens obtained by Moritz in the province of Merida, Western Venezuela, is evidently the same as our Panama species. *P. ilus* is distinguished from *P. ariarathes* and *P. evagoras* (with which it has been confounded) by the absence of the red streak from the base of the fore wings beneath, and by the spots of the occiput and prothorax being red instead of white. Its nearest relative is the *Papilio branchus* of Guatemala.

5. PAPILIO ANCHISIADES, Esper.

Var. *pandion*, Boisduval, MS.

The true *P. anchisiades* is found abundantly in semicultivated places throughout the Amazons region and in Guiana; but although in most districts variable and tending to segregate local varieties, I have not seen any variety approaching the present one which is known as inhabiting Southern Mexico. It differs from the type in having, on the fore wings, instead of a large cream-coloured rounded spot near the hinder margin, a long oblique streak of the same colour extending from the costa across the cell towards the outer margin. There is only one example in the collection.

6. PIERIS MONUSTE, Linn. et auct.

Var. B. Boisduval, Spec. Gen. des Lepidop. p. 495.

Differs from the type in wanting the dusky streaks on the under surface of the hind wings. The typical *P. monuste* occurs abundantly throughout the whole of Tropical South America; the var. B appears to be peculiar to Central America.

7. CALLIDRYAS STATIRA, Cramer.

The three specimens of this species differ from South American examples in the opake ochreous coloration of the under surface of the hind wings. The species is one which performs extensive mi-

grations, countless thousands being seen, on travelling along the Amazons in the fine season, all moving in one direction. It is a proof, however, that these migrations do not extend very far in a limited time, that in the not very distant region of Panama a quite distinct local form exists.

8. CALLIDRYAS TRITE, Linn. et auct.

The specimens of this and the following are precisely similar to South American examples.

9. CALLIDRYAS ARGANTE, Fabricius.

10. DANAIS THERSIPPUS, n. sp.

♂. Wings, above (including the nervures), dull reddish brown, with a distinct, rather broad, dark-brown outer border of nearly uniform breadth. The white spots of the fore wings are the same in number and arrangement as those of *D. eresimus*, Cramer (Pap. pl. 175. figs. G, H), except that the exterior row is continued to the apex of the fore wings, instead of being interrupted. The dark border of the hind wings is nearly spotless.

Beneath, the fore wings are the same as above; but the hind wings have the nervures bordered with dark brown, which dark borders are again accompanied by lines of white: the dark outer borders of the wings have a double row of large white spots. Body and antennæ as in *D. eresimus*. Expanse 3″ 4‴.

This species seems to be midway between *D. eresimus* and *D. erippus*, and resembles very closely *D. berenice*; but the ground-colour of the wings is of a duller and browner shade than in any of those species.

11. TITHOREA TARRICINA, Hewitson.

Tithorea tarricina, Hewits. Exot. Butt. Helic. iv. f. 1.

This very fine and distinct species is at present known only from New Granada, whence it has been received in the same way as the rest of the large collections exported from that country, namely, without further information about its locality and range. The Panama specimens (two) differ from the New Granada one figured by Hewitson in the yellow stripe towards the apex of hind wings being nearly obliterated.

12. DIRCENNA CALLIPERO, n. sp. Pl. XXIX. fig. 4.

♂. Fore wings above with the basal third reddish tawny, semi-transparent, the costa being dusky, and the centre of the cell having a small round dusky spot; beyond this a broad semitransparent belt of a yellowish hue crosses the wing from the subcostal nervure to near the hind angle; the rest of the wing is dusky, with a subapical yellowish belt from the costa to near the middle of the outer margin. Beneath, the same, except that there are three whitish spots near the apex.

Hind wing, above, reddish tawny, semitransparent, with a well-defined black outer border, broad near the apex, and gradually narrowing to the anal angle. Beneath, the same, except that there is a submarginal row of large silvery-white spots. Body brown; wing-lappets reddish tawny. Antennæ black; club yellowish. Expanse 2″ 2‴.

This species is of the same size and shape as *Dircenna epidero* of the Amazons region; it has, however, no near relationship to that or any other of the variable forms of this genus.

13. ITHOMIA VICTORINA, Guérin.

Heliconia victorina, Guérin, Iconogr. Règne Animal, texte, p. 470.
Ithomia victorina, Hewitson, Exot. Butt. Ith. fig. 75.

This species is hitherto known only as inhabiting Venezuela and Bolivia; it is entirely absent from the intervening plains of the Amazons, where no form at all nearly related to it is found. There is one example in the present collection.

14. ITHOMIA NEPHELE, Bates.

Ithomia nephele, Bates, Trans. Linn. Soc. vol. xxiii. p. 548.

This interesting form appears to be abundant on the isthmus, there being twelve examples in the collection. It is very closely allied to *I. nero* (Hewitson, Exot. Butt. Ithom. f. 37), differing only in being smaller and in the lower discocellular nervule of the hind wings lying at a much more acute angle with the median nervure. It is found also at Tabatinga, on the upper part of the Amazons region (being quite absent from the lower part thence to the Atlantic); its line of migration, therefore, like that of *I. victorina*, would seem to lie along the eastern side of the Andes, the easternmost chain of which it has crossed to reach the Isthmus of Panama.

15. ITHOMIA IPHIANASSA, Doubleday.

Ithomia iphianassa, Dbldy. in Dbldy. & Hewits. Gen. Diurn. Lepid. pl. 18. f. 3; Hewits. Exot. Butt. Ith. f. 91–93.

Local var. or race *panamensis*.

Ithomia iphianassa has been recorded as inhabiting Venezuela and New Granada, in which latter region it appears to be very unstable. It has lately been received also in some numbers from Canelos, on the eastern slope of the Andes in Equador (sent by Spruce, the well-known botanical traveller), but, if we may judge from the large number of examples sent, all closely resembling each other, exists there as a well-marked and constant local variety or race. The single specimen contained in the present collection from Panama appears to represent another equally well-marked race. Thus *I. iphianassa* would seem to be one of those interesting forms whose present condition throws great light on the formation of species, being very variable towards the centre of its area of distribution, and showing the segregation of distinct races or semispecies in different parts of the confines of its area. It is to be remarked that whilst the Canelos

race approaches one extreme (fig. 93 of Hewitson, *op. cit.*) of the New Granadian unstable form, the Panama one approximates the opposite extreme (fig. 91, *op. cit.*), both the Canelos and the Panama forms being further divergencies in the direction of these two extreme varieties.

Ithomia iphianassa, var. *panamensis*. Pl. XXIX. fig. 5.

♀. Wings opake; fore wing above with the basal third orange-tawny, which colour is prolonged a short distance along the costal and hind margins, the costal edge being black, and the centre of the cell ornamented with a large rounded black spot; this is followed by a broad, oblique yellow belt, commencing at the subcostal nervure, and narrowing to its termination near the hind angle. Apical portion of the wing beyond the cell black, crossed in the middle by a row of three widely distant yellow spots; apex with three smaller whitish submarginal spots. Beneath, the same, except that there is a row of seven submarginal white spots.

Hind wing above with the basal half orange-tawny, the outer half black, the black portion contracted near the apex, which has a row of three minute whitish spots. Beneath, the same, except that there is a yellow spot at the root of the wing, a black spot at the end of the cell, and a row of white submarginal spots. Antennæ orange, basal portion blackish. Thorax yellowish, with two white dorsal lines; collar orange. Abdomen dark brown. Expanse 2″ 2‴.

16. ITHOMIA BALBOA, n. sp.

♀. Wings semitransparent; fore wing above with the basal third orange-tawny, and with a rounded black spot in the middle of the cell, the costal edge being broadly black. To this succeeds a broad oblique yellow belt, commencing near the costal edge, and extending nearly to the hind angle; rest of the wing sooty black, semitransparent, the nervures darker, the black colour extending on the basal side of the first median branch to the median nervure. This black apical portion is crossed by a light yellow belt, extending from the costa to near the middle of the outer margin. Beneath, the same, except that there are three clear white spots in a row near the apex.

Hind wing, above, orange-tawny, with a broad black outer border of uniform width. Beneath, the same, except that the black outer border has a submarginal row of clear white spots. Antennæ black; club orange-yellow. Body brown; collar, wing-lappets, and thorax spotted with light yellow. Expanse 2″ 4‴.

This species is nearly related to *I. iphianassa*, having the same disposition of the nervures on the hind wings, which approximates this group to the subgenus *Ceratinia*. It is, however, quite distinct, having a white-spotted, instead of orange, prothorax—a character which distinguishes minor groups of species in this genus. It is identical in colours with a species figured, since the present paper was read, by Mr. Hewitson, under the name of *I. agrippina* (Exot. Butt. Ithom. f. 152—New Granada), but differs in the neuration of the hind wings, *I. agrippina* having the nervures so disposed that

the lower radial (or discoidal) is not visible across the wing—a character which places it in the section *Hymenitis*.

17. ITHOMIA (CERATINIA) LEUCANIA, n. sp. Pl. XXIX. fig. 2.

♀. Fore wing above with the basal third orange-tawny; costal edge dusky at the base; on the outer edge of the basal tawny part there are two large subtriangular black spots, namely, one in the middle of the cell, and one between the median nervure and its first branch; to these spots succeeds a short discoidal white cross belt, separated into two elongate spots; apical portion of the wing black, crossed in the middle by a flexuous white belt, beginning on the costal edge, and ending at a distance from the outer margin near the middle; besides which there is a submarginal row of seven large white spots. Beneath, the same.

Hind wing, above, orange-tawny, with a discoidal indented stripe and the outer border (narrowly) black; the border has a row of white submarginal spots, which are partly indistinct. Beneath, the same, except that the root of the wing has a yellow spot. Antennæ yellowish; base black. Collar and wing-lappets orange-tawny. Thorax marked with yellow. Expanse 2″ 4‴.

This species might perhaps be more correctly treated as one of the numerous local forms of *Ithomia* (*Ceratinia*) *ninonia*, in the same way as *I. panamensis* is placed as a race of *I. iphianassa*; but the grouping of the different races of *I. ninonia* would lead to the classing together of so many forms, graduating from the slight variety to the well-segregated species, that the combined set would be almost equivalent to a subgenus. I have described the way in which a great part of Tropical America is peopled by these derived species and semispecies in a former treatise (Linnean Trans. vol. xxiii. p. 524); to the list there given the present new local form may be added. The general practice of descriptive naturalists, especially ornithologists, is to treat every local form, however slight may be its distinguishing characters from its nearest relatives, under a separate head, in the same way as the more distinct species, leaving the impression that all the successive forms numbered in order under a given genus are neatly circumscribed species. This might be done to a certain extent in the group of forms to which *Ithomia ninonia* belongs; for many of the local races, notwithstanding their close alliance to the type, seem to be tolerably constant. But in one part, at least, of its area the species presents so finely graduated a series of varieties that the separation into these distinct local forms or assumed species is impossible; the whole must be considered as one variable form. If, however, it be considered so, the facts of variation exhibited are such as to compel us to infer that all the other more distinct local races, allied to it, have been derived from the same stock; for the varieties show in some districts a tendency to segregation, in one of them being more abundant than the others. Protean species, like *I. ninonia*, are not uncommon in entomology; and the close study of their varieties with reference to their geographical positions throws great light on the formation of races and species. Did none such exist,

and were the species in every genus so neatly arranged and circumscribed in nature as they are in the monographs of naturalists, the conclusion arrived at by most students, namely that they were all independently created, would be certainly the only one that could be drawn. It would be desirable to know whether none of these instructive species occur in ornithology and in the other branches of zoology.

18. MECHANITIS ISTHMIA, n. sp. Pl. XXIX. fig. 1.

Expanse 2″ 7‴. Fore wing, above, brownish black, a basal streak over the median nervure and the hind margin being orange-tawny; a spot across the cell near its termination, an interrupted belt across the wing from the costa to near the middle of the outer margin, and an oblong subapical spot yellow. Beneath, the same, except that the hind angle is also orange-tawny, and that there is a row of eight submarginal white spots along the outer margin.

Hind wing, above, orange-tawny, with a spot near the apex and a narrow outer border from the middle of the costa to the anal angle brownish black. Beneath, the same, except that the root of the wing has a yellow spot, and that there is a submarginal row of five white spots.

Body brownish; wing-lappets and thorax spotted with tawny-orange; antennæ yellow, with the base dusky.

This is one of the numerous local forms of *Mechanitis polymnia*, a species which exhibits the process of variation, segregation of local varieties, and formation of species in the same way as already described under *I. ninonia*. But the proof of complete formation of a species is more complete here than in the last, seeing that one at least of the local forms—proved by the existing variability of the species in other districts to have been derived from the same stock—coexists with a sister form without interbreeding with it. The various races and half-formed races of *Mechanitis polymnia* are distributed each in its district over the whole of Tropical America; the two sister races which coexist in the manner described are *M. polymnia*, var. *lysimnia* and var. *nesæa*, in the neighbourhood of Bahia in South Brazil.

19. HELICONIUS HECALESIA, Hewitson.

Heliconia hecalesia, Hewits. Exot. Butt. Hel. f. 6.

This most beautiful and distinct species, like *Tithorea tarricina*, has hitherto been recorded only as inhabiting New Granada. Like *T. tarricina* also, the Panama example differs in a slight degree from the New Granada type, the yellow submarginal spots of the hind wings being much smaller.

20. HELICONIUS DEMOPHOON, Ménétriés.

Heliconia demophoon, Ménétr. Cat. d. l. Coll. Imp. Ac. des Sci. St. Pétersbourg, p. 86, t. 2. f. 4.

This handsome species occurs also in Nicaragua and Mexico. It

is closely allied to *H. amaryllis* (Felder) of Eastern Peru; and both are so nearly related to *H. phyllis*, the common species of Southern Brazil, that all three might be treated as local forms of one stock. No species at all nearly related to these three is found in the Amazons plains: this confirms what has already been remarked under *Ithomia nephele*, namely, that the line of migration of species across the equator has been along the eastern slopes of the Andes.

21. HELICONIUS ERATO, Linn. et auct.

This species is widely distributed over the northern part of South America.

22. COLŒNIS VANILLÆ, Linnæus.

A very common species in the tropical and subtropical zones of the New World. I have noticed that the examples from Florida are much more bright in colour and more sharply defined in markings than those from Tropical America.

23. COLŒNIS PHAËTHUSA, Cramer.

Also a widely distributed species; it seems to remain constant in all districts.

24. ANARTIA FATIMA, Fabricius.

This species is peculiar to Central America. It seems to be common on the Isthmus.

25. PYRRHOGYRA TIPHA, Linnæus.

The Panama example does not differ from Pará ones; the species nevertheless is strongly modified in the much nearer region of the Upper Amazons.

26. PREPONA AMPHITOË, Goddart.

The single example does not differ from those taken by myself in the Amazons region.

27. PAVONIA AJAX, Doubleday.

Caligo ajax, Westwood, in Dbldy. & Hewits. Gen. Diurn. Lepid. pl. 56. f. 2.

This magnificent species has been hitherto recorded only as inhabiting Venezuela and Guayaquil: there is one example in this collection.

28. PAVONIA OILEUS, Felder.

Caligo oileus, Felder, Lepid. Nov. Columbiæ, no. 106.

There are three examples of this species, which appears to be peculiar to the regions bordering the south-western part of the Gulf of Mexico, it having been received from New Granada and the province of Caraccas in Venezuela.

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J. Jennens del. et lith.

Hyla A & B HYLA PERONII.
C. HYLA PLYLLOCHROA.
D. HYLA [illegible].

29. PAVONIA ILIONEUS, Cramer.

This is a widely distributed species in Tropical America. I find no difference worthy of note between Amazonian, Bogota, and Panama examples.

30. PAVONIA AUTOMEDON, Cramer.

Also a widely distributed species, reaching as far south as Bahia in Brazil. The single Panama example does not differ from those taken by myself in the Amazons region.

31. EUPTYCHIA OCYRRHOË, Fabricius.

This small and weak-flying insect is also widely distributed, and appears to remain constant in its specific characters.

2. OBSERVATIONS ON AUSTRALIAN TREE-FROGS LIVING IN THE SOCIETY'S MENAGERIE. BY DR. A. GÜNTHER.

(Plate XXX.)

The only Australian Batrachian which, to my knowledge, has until lately been exhibited in the Society's menagerie is *Pelodryas cæruleus* (*Hyla cærulea*, White), a specimen of which, almost unobserved, lived there for two or three years. In the beginning of the spring of this year, however, an opportunity was taken of procuring eight specimens, which were imported by a collector from New South Wales, and which belonged to four species, viz. to *Pelodryas cæruleus*, *Hyla peronii*, *Hyla krefftii*, and to an apparently undescribed form, which we shall name *Hyla phyllochroa*. Having had opportunity of observing these for some time in the Gardens in the Regent's Park, as well as at my own house, I may make the following remarks. In general, I was surprised to find a great similarity in their habits with those of our common European Tree-frog. They sleep during the day, squatting in a corner, generally selecting a place in which they are hidden from view, but easily roused on the approach of some insect, which they seize with their tongue. When the prey is large, or when they have accidentally seized a small piece of wood, &c., together with the insect, they use their fore foot to push the insect into the mouth, or to remove the object which is unfit for food. They never enter the water during the summer months, and tried to escape from a tank when put into it. They leave their hiding-places towards dusk, becoming very lively, apparently less with the object of obtaining food (which they can only procure by quietly remaining in wait for it) than with that of enjoying themselves; and *Pelodryas cæruleus*, which is endowed with a voice, indulged every evening in a musical performance. They became more quiet after midnight, and at sunrise they had settled down at some resting-place, sometimes one individual choosing the same place for several consecutive days. They preferred bluebottle flies to every other insect, and never touched ants or black beetles. *Pelodryas cæruleus*

feeds freely on meal-worms when other food is scarce; but they are frequently vomited, and I doubt whether these frogs could be kept in good health if restricted to this particular kind of food. In all these points the Australian species mentioned agree with the European Tree-frog, and I need hardly say that they as easily climb smooth surfaces, glass, &c., as the latter species.

Pelodryas cæruleus, White (Günth. Batr. Sal. pl. 9. fig. B).—The natural colour of this species is a light grass-green, which, when the animal is kept in the dark or in a very wet place, changes into dark sap-green; roundish yellowish-white spots are sometimes scattered on the sides. I have mentioned above that it has a voice, which is a kind of grunting, somewhat resembling that of *Rana esculenta*, but lower. I must remark, however, that the two examples in the menagerie, a male and female, are evidently not full-grown; and I was rather surprised to hear a voice at all from the male, as in *Hyla viridis* the vocal sac and the voice are not developed before the individual has attained to maturity and to its full size. The hind limbs are comparatively short, and therefore this species cannot make such wide jumps as the true *Hylæ*. I could not observe any secretion from the parotoid glands, which are so much developed in full-sized individuals, but which are scarcely perceptible in our specimens. These Frogs soon became familiar, especially the male, which, when I went to feed them, used to approach and to watch the opening through which I introduced the flies into their cage.

Hyla peronii, Bibron (Plate XXX. figs. A, B, *a*).—This species is very remarkable on account of the change of its colours. When awake (see fig. A) it is brownish olive, covered all over with blackish-brown spots, between which small green dots are scattered; the anterior and posterior sides of the thigh and the loin are bright yellow, with irregular reticulated black spots. The pupil is open, horizontally elliptic, and crossed by a very distinct blackish vertical band. We have given a second figure of the same individual (fig. B) when asleep: the dark spots disappear entirely, the ground-colour becomes lighter, sometimes even lighter than it is indicated in the figure; the green dots are very indistinct, and the numerous tubercles with which the skin is covered are whitish at the top. The pupil is contracted into a minute square opening, from which four black lines radiate.

This species is very nimble in its motions, making great leaps when pursued, and darting after flies from 8 to 10 inches distant; but it frequently misses its aim in these attempts. I have heard it emit a sound, but only when it was caught, and which I cannot otherwise describe except by comparing it with that emitted by *Hyla arborea* under similar circumstances.

Hyla krefftii (Pl. XXX. fig. D).—A single specimen of this species, lately described by myself*, being in the collection, I am enabled to give a description of the natural colours. A broad brown band commences between the eyes and extends to the vent, occupying the back almost entirely; it is lighter along the middle; another dark-brown band descends obliquely from the eye to the humeral pit;

* Ann. & Mag. Nat. Hist. 1863, xi. p. 28, pl. 4. fig. C.

the sides are light reddish olive, and covered with minute brown dots, like the back. The hind part of the thigh is of a beautiful purple colour. This species changes the colours but little; but they appear darker and the markings more intense when the animal is awake than when asleep. Our specimen is much less greedy and less active than *H. peronii*, although it is not less slender, and makes leaps as long as the other species; it selects its hiding-place on the ground below some stones. I have not heard any voice from it; but I am not certain about its sex.

Hyla phyllochroa, n. sp. (Pl. XXX. figs. C, *c*).—Snout rather short, broad, with the canthus rostralis angular. The vomerine teeth form two very small groups, situated behind the level of the hinder edge of the inner nostrils. Tympanum distinct, much smaller than the eye. Tongue scarcely notched behind. Perfectly smooth above; belly granular; a fold across the chest. Fingers one-fourth webbed; the membrane between the toes does not extend to the terminal disk. Uniform green above, white below; a very narrow, slightly prominent black line, edged with yellow superiorly, runs from the eye, above the tympanum, to the side of the body, where it is lost.

Besides the living specimen in the Society's menagerie, I have examined three others in the British Museum (two from Sydney, received through Messrs. Cuming and Krefft, and one from Errumanga, New). This species possesses the faculty of changing its colours only in a slight degree; it is generally of a uniform light sap-green, which, under certain circumstances, becomes darker. I have not heard a voice from it. Those in the British Museum are females; the largest has the ovaria fully developed, and measures 17 lines from snout to vent; the hind leg 29 lines.

3. Note on the Occurrence of the European Sea-Eagle in North America. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

It is well known that the European Sea-Eagle is found in Greenland. Professor J. Reinhardt, in his article on the Ornithology of Greenland, published in the 'Ibis' for 1861*, states that it is "very common" in that country, occurring "in South Greenland all the year round, in North Greenland only in summer." But I am not aware that any instance is hitherto known of this Eagle having been met with on the continent of North America; indeed Professor Baird, in his 'Birds of North America,' states the contrary to be the case. I have therefore thought that it would be desirable to place on record a short statement of the facts which induce me to believe that the *Haliaëtus albicillus* is not merely an occasional visitant to the northern shores of North America, but even resides and breeds in that country.

In December 1861, Mr. A. W. Crichton deposited in the Society's

* "List of the Birds hitherto observed in Greenland," Ibis, 1861, p. 1.

Gardens two young Eagles. Although it is not possible to be certain of the species of *Haliaëti* in their immature plumage, these two birds seemed to be of the common European species. I was therefore much surprised when Mr. Crichton informed me that he had obtained them in Nova Scotia. One of the two birds deposited by Mr. Crichton died in our Gardens in June 1862. The companion bird, which was presented by Mr. Crichton to Lord Lilford, still lives in his lordship's menagerie, and, as I am informed by its noble owner, although two years old, shows no indication of being anything else than *Haliaëtus albicillus*. I subjoin Mr. Crichton's kind reply to my application for exact particulars as to the capture of these birds.

"11 Eaton Place, S.W.

"My dear Sclater,—It would give me the utmost pleasure were I able to give you more satisfactory answers to your queries concerning the American Eagle; but I will tell you all I know about them. One morning (August 12th, 1861) a rough-looking seafaring Yankee appeared at the mess-room door of the barracks where I was staying when at Halifax, Nova Scotia, with a young Eagle under each arm, which he offered for sale. All I could learn from him was that he had obtained them "somewhere *up* the coast" by cutting down a tree. The exact spot (even had the man been aware of its name, which I doubt) I am sorry I did not take the precaution to register. I never felt perfectly certain myself as to what they were, whether *washingtonii*, Jard., or *leucocephalus*, Savigny; but the present state of plumage of the survivor must begin to speak for itself. I have not yet seen Lord Lilford this season, and so know nothing of the present state of the case. With my best regards,

"Believe me, yours very truly,

"Arthur William Crichton."

"Saturday, June 20th."

So far for one instance, which appears tolerably conclusive as to the breeding of *Haliaëtus albicillus* in Nova Scotia. But I have a second case, which seems equally circumstantial in its details. On the 25th of last month Mr. J. Rendall, of Old Palace, Croydon, presented to the Society a specimen of the European Sea-Eagle, taken from the nest near St. John's, Newfoundland, by his brother. In answer to my application, Mr. Rendall informs me that he has mislaid the letter that advised him of the shipment of the Eagle in question, but that he is quite certain of its having been obtained by his brother in Newfoundland in the manner stated.

I shall, of course, not neglect to get further information of the exact spot where this latter bird was obtained, when Mr. Rendall's brother arrives in this country, which will shortly be the case. But looking at the map, and observing the close proximity of the shores of Southern Greenland (where *Haliaëtus albicillus* is common) to Newfoundland and Nova Scotia, I am only surprised that this bird has never before been noticed on the American continent.

P.S. Since this paper was read, I have received information from Mr. Rendall that the Eagle in question was taken from a nest in

Placentia Bay, about 100 miles from St. John's, Newfoundland, where this species breeds every year.

4. Notice of a New Species of Batagur from North-western India. By Dr. J. E. Gray, F.R.S., F.L.S., etc.

Sir Andrew Smith, M.D., has lately sent to the British Museum, with some other interesting reptiles, a young specimen of *Batagur* from the River Chenab, which seemed different from any that I had hitherto seen; but I was disinclined to describe a species on a single specimen in a young condition.

Dr. Günther, the other day, found in a collection that was offered for sale at Chatham a specimen of a *Batagur*, which he thought was different to any that we had in the Museum; and I have little doubt that this specimen is an older and probably nearly adult specimen of the same species as that sent to the Museum by Sir Andrew Smith. I therefore proceed to give a short notice of them.

The species is intermediate in character between the sections *Kachuga* and *Pangshura*. It has the elongated rhombic fourth vertebral plate of *Pangshura*; but the feet are very broad, the toes long, the claws elongate; the back is evenly rounded, and the second vertebral plate broad and six-sided, as in *Kachuga*.

Batagur smithii.

Shell oblong above, rather wider and very slightly dentated behind; the back regularly rounded, interruptedly and subnodosely keeled. The three first vertebral shields oblong; the first rather urceolate; the second subhexangular, rather broader than long; the third narrower, nearly twice as long as broad, with a prominent keel on the hinder half; the fourth very long, tapering, and very narrow in front, square, truncated, and keeled behind; nuchal shield small; marginal shields broad, the sixth and tenth with the upper edge produced upwards; the sternum flat, slightly keeled on the sides, white, it and the underside of the marginal shields blotched with blackish; the gular plate triangular.

Hab. North-western India: Punjab; "River Chenab, 3rd December, 1848."

The younger specimen is not so strongly keeled; the second and third vertebral plate are rather broader compared with their length, and the fourth is more nearly lozenge-shaped.

This species, which will be figured in Dr. Günther's 'Reptiles of British India,' which he is preparing for the Ray Society, may be known from *B. lineata*, which it most resembles, by the shell being more ovate, and by the form of the fourth vertebral plate, which is so contracted in front that it is not wider than the keel of the third vertebral shield.

I have named this species after my excellent friend Sir Andrew Smith, the late Director-General of the Army Medical Board, an encourager of science, and very accurate and industrious herpetologist and traveller.

5. Description of a New Geoclemys lately living in the Gardens of the Zoological Society. By Dr. J. E. Gray, F.R.S., F.L.S., etc.

Some time ago the British Museum received a *Geoclemys* from the Zoological Society that had been living in the Gardens, which we have preserved in spirits. Having occasion to examine it the other day, in connexion with some other Terrapens more lately received, it appears to be distinct from any other that we have, and from any that I can find described. Unfortunately it was not accompanied by any account whence it came, so that I cannot give its habitat.

Geoclemys callocephalus.

Shell oblong, convex, bluntly keeled; dark blackish brown; shields thin, slightly ringed, the margin nearly entire; vertebral shields about



as long as broad, the second and third rather longer; nuchal shield short; the marginal shields broad, the ninth rather higher than the rest; underside of these yellow, not spotted or ringed; the sternum convex, rather bent up in front, broadly truncated before, and behind pale yellow, more or less blackish on each side of the central line. The upper part and side of the neck pale; the upper part of the legs closely speckled with minute black dots; the front of the fore legs pale, with some black spots on the edge of the large flat scales which cover this part; the front toes short, coalesced nearly to the claws, with a few rather narrow angular shields on the upper surface; the palms covered with moderate scales, and with a cross row of five large, nearly uniform-sized, squarish shields on the hinder part of the wrist; the hind legs covered with small scales; the hind foot broad, the toes short, and coalesced like the front one, but with rather larger shields above the soles, with moderate-sized scales, and with some large triangular shields at the hinder part of the heel, in two or three series; the chin and throat white, spotless; the head rather flattened; the eyes lateral; upper jaw slightly notched in front; the crown of the head (in spirits) pale, with three black-edged white broad streaks concentric one within the other, and diverging parallelly towards the occiput, where they are lost among the black specks; cheek with five or six narrow black horizontal lines, the lower bending up to the tip of the ears; there is an obscure black streak from the nose to the middle of the orbit, and a narrow streak near the upper edge of

the upper jaw, and some black oblong spots on the lower side of the ear and temple, which may be more distinct in the living specimen.

Hab. Unknown; perhaps China.

This species in several respects agrees in form and appearance with *Emys chinensis*, of which, as is shown by the specimen brought by Mr. Swinhoe to this country, the Tortoise described by me as *Emys bennetti* is only the adult. It is at once known from *E. chinensis* by the minutely speckled body and the bands on the head, and by the under surface of the marginal shield being destitute of any rings or spots. The head and neck of *E. chinensis* are covered with uniform narrow black lines, which on the chin and throat form circles. *E. chinensis*, like *E. bealei*, is a true *Emys*, with slender, distinctly developed toes and fingers, which are united by a web to the claw,—*E. chinensis* having moderate-sized thick scales in the front of the fore legs, with some larger and broader scales, or small shields, scattered among them, and *E. bealei* small granular scales on the legs, with three or four broad, thin, lunate, band-like shields across the front of the fore legs.

In the black speck on the neck and body, and the ornamental lines on the head, this species has some affinity to *E. pulcherrima*, described and figured in my Catalogue from a very young specimen, said to come from Mexico. But this habitat is doubtful, as some other animals, procured from the same person and said to be from the same habitat, have proved to be from other countries. This species also, as far as can be judged from the dry state of the specimen, may probably be a *Geoclemys*.

6. Description of a New Species of Macrurous Decapod Crustacean belonging to the Genus Penæus, from the Coast of Portugal. By James Yate Johnson, Corr. Mem. Z. S.

Penæus bocagei, sp. n.

The subcylindrical carapace is less than half the length of the abdomen, including the caudal segment, and is excavated at the middle of the posterior margin. A median crest commences near the posterior margin, and projects in front as the rostrum, which is more than half the length of the carapace. This rostrum extends much beyond the eyes, but not quite so far as the distal extremity of the peduncle of the superior antennæ. It has a slight sigmoid flexure, is compressed, and is marked at each side with two low crests and two grooves. Its lower edge is simple; but its upper edge carries eight small teeth, the first of which is over its base, and the last some little distance from its anterior extremity. There is a fringe of hair at the lower edge posteriorly. The median crest of the carapace carries a single tooth, which is distant from the anterior margin about one-third of the length of the carapace. At each side of the carapace, a little in front of this tooth, there is a large tooth or small spine, in

the neighbourhood of which there is a depression. Above the spine a narrow and somewhat sinuous groove extends nearly the whole length of the carapace. A little behind each anterior angle of the carapace there is another spine smaller than the one last mentioned. The anterior margin of the carapace is deeply excavated at the base of the inferior antennæ, and between this excavation and the base of the ocular peduncle there is a strong sharp tooth or spine; whilst over the base of the eye-stalk there is a minute angular projection, hardly to be called a tooth. The eye is large, being both broader and longer than its stalk.

The superior antennæ have the basal joint of the peduncle broad and much hollowed to receive the eye, and its inner border carries a short lamellar appendage. Each has two filaments with thickened bases, of which one is nearly twice as long as the other, and the longer has a length nearly equal to that of the carapace exclusive of the rostrum. The basal joint of the inferior antennæ is short and thick, and it has a small emargination in front on the upper side. Their palps are large, extending very nearly as far as the rostrum, and they are shaped like the quarter of an elongated ellipse; but the thick outer margin curves slightly inwards, and projects in front as a short tooth. The inner margin is fringed with hair. The filament is longer than the total length of the Crustacean, including the rostrum.

All the feet are slender, and the first three pairs are two-fingered, with ovate hands, the rest being monodactyle: none are multiarticulate. The order of their length, commencing with the longest, is 5, 4=3, 2, 1; the third and fourth pairs reach beyond the eyes; the first pair has a fringe of hair at the under edges of all the joints, and the second and third joints each carry a spine at the distal extremity of the underside. The first pair of pedipalps is long, slender, and pediform; they extend beyond the eyes.

The abdomen is subcompressed in front, much compressed behind, and the anterior five segments are furnished with large and prominent false feet, each terminated by a pair of narrow flexible plates fringed with hair, of which the outer one is longer; the basal joint is shorter than either. All the segments have their inferior margins fringed with hair. The fourth, fifth, and sixth segments possess a median keel, which terminates posteriorly with a small sharp tooth; and the sixth segment has in addition a small tooth at each posterior angle. The posterior margins of the fourth and fifth segments have a small notch at the middle of each side. The seventh or caudal segment is about as long as the sixth, which is longer than any of the preceding segments; it is narrow, terminates in a point, and is armed with a small spine at each side near the posterior extremity. The lateral plates are narrowly oval and fringed with hair; both pairs extend beyond the seventh abdominal segment, but the outer plates are larger than the inner, which latter have a longitudinal median groove on the upper surface between two low crests. There is also a groove on the upper surface of the exterior plates; but it is not in the median line, and it terminates at the outer margin not far

from the posterior extremity of the plate. At this place there is a small sharp tooth, and here commences a low crest which crosses the plate with a curve and divides it into two unequal portions. The common basal joint of these plates has a small sharp tooth at its postero-exterior angle.

Large quantities of this *Penæus* are taken at the mouth of the Tagus during the spring and summer months; and it frequently appears on the breakfast-tables of the hotels in Lisbon, where indeed it first attracted my attention. It is known in the market under the name of "Camarão," *i. e.* Prawn. The living Crustacean has a pale red colour, which deepens on being boiled into the pinky red of our Prawn. It may be readily distinguished from *Penæus caramote*, which has also been taken on the coast of Portugal, by the single crest on the carapace, by the absence of teeth from the underside of the rostrum, by the presence of a spine near the anterior lateral angles of the carapace in addition to the spine between the bases of the inferior antennæ and the eye-stalks, by the much greater length of the filaments of the superior antennæ, which in *P. caramote* are not more than a fourth of the length of the carapace minus the rostrum, by the absence of spines from the two basal joints of the second and third pairs of legs, and by the presence of a single spine, in place of three, at each side of the caudal segment of the abdomen.

Examples having a total length, including the rostrum, of $5\frac{1}{4}$ inches, and a carapace with a width of rather more than half an inch, are not uncommon; but the finest specimen I have seen was kindly presented to me by Dr. J. V. Barbosa de Bocage, Director of the Royal Museum of Lisbon. This specimen, which is now in the British Museum, has the following dimensions:—

	inches.
Total length from tip of rostrum to end of caudal plates	$6\frac{6}{16}$
Rostrum, length	$1\frac{1}{8}$
Carapace, without rostrum, measured at the side, and including the frontal spine	$1\frac{10}{16}$
Carapace, width	$\frac{10}{16}$
Abdomen, length to the tip of the caudal segment	$3\frac{12}{16}$
First legs, length	$1\frac{5}{8}$
Fifth legs, length	$2\frac{1}{16}$
Outer pedipalps, length	$1\frac{9}{16}$

7. Description of a New Siliceous Sponge from the Coast of Madeira. By James Yate Johnson, Corr. Mem. Z. S.

Order SILICEA, Bowerbank.

Dactylocalyx, Bowerbank, Phil. Trans. 1862.

Skeleton siliceo-fibrous. Fibres solid, cylindrical. Reticulations unsymmetrical.

DACTYLOCALYX BOWERBANKII, sp. n.

The skeleton of this sponge is composed of an inelastic network of silex of a dense and irregular structure. Under a power of sixty diameters a slice of it resembles the crumb of bread, without any trace of the structure resembling spoked wheels, such as is exhibited by a siliceous sponge preserved in the Museum at Paris under the name of *Iphiteon*—a similar structure being also seen in the pith of some water-plants. The fibre is smooth, but somewhat nodulous. The skeleton is covered with a rather thin crust, of a close texture, without conspicuous orifices, and this crust abounds with large spicula of the form denominated "spiculated patento-ternate" by Dr. Bowerbank in his memoir read before the Royal Society in 1857; and some of them are developed into the dichotomo-patento-ternate form, such as is represented in fig. 48 of plate 23 of the 'Philosophical Transactions' for that year. But in the sponge under description the shaft is not prolonged through the common base of the triradiating branches, and the second division of these branches is much longer than the first or third; the third division, or ultimate branchlets, are pointed, and not in the same plane with each other or with the preceding portion of the branch, just as in the case of the spiculum represented in the figure already referred to. The shafts of the spicula project into the reticulations of the skeleton. In addition to the large spicula, the dermal membrane abounds with minute elongo-stellate spicula having short stout cylindrical radii; and a very few of these are dispersed in the interstitial membranes beneath the dermis. On the surface of the skeleton, immediately beneath the dermis, there is an abundance of long acuate spicula, disposed either singly or in fasciculi which are often parallel with each other. These acuate spicula are not found in the deeper interstitial portions of the sponge, but a few long, very slender, and flexuous spicula are occasionally to be found there. No sexradiate spicula could be detected, nor were any gemmules observed.

The single example of this sponge which has been obtained was brought up from deep water off the coast of Madeira. It was attached to a rock or stone by the middle portion of the underside. Its colour is white; and although its texture even when fresh was firm, the finger-nail easily made a permanent impression upon its surface. The animal matter was in comparatively small quantity. When a portion of the sponge was immersed in nitric acid it acquired a yellow tinge. The shape is that of a concave disk or shallow cup, with the border undulated into a few strong folds, some of which rise two or three inches above the rest of the surface. In one instance the opposite sides of a fold have grown together. The general appearance calls to mind a large fungus such as is sometimes seen attached to the trunk of an old tree. It measures fourteen inches across in one direction, in another twelve inches, and it has a thickness varying from half an inch to nearly an inch.

Dr. Gray has had the kindness to let me examine the half of a siliceous sponge which came into his possession from Mr. Stutchbury, who obtained it, I understand, from Barbadoes, and described it in

the 'Proceedings of the Zoological Society,' 1841, p. 86, under the name of *Dactylocalyx pumiceus*, in these words:—"Sponge fixed, siliceous; incurrent canals uniform in size; excurrent canals large, forming deep sinuosities in the outer surface, radiating from the root to the outer circumference." Comparing the sponge now described with Dr. Gray's, I find in mine no well-marked system of incurrent and excurrent canals with large orifices, as in the Barbadian sponge, which latter is of a much more open and porous texture, and besides exhibits in its present state not the slightest trace of a skin.

Dedicated to Dr. J. S. Bowerbank, F.R.S., who has devoted his attention for many years to the Spongiadæ, and who is now giving to the scientific world, through the medium of the 'Philosophical Transactions,' the results of his important investigations.

8. Catalogue of the Birds of China, with Remarks principally on their Geographical Distribution. By Robert Swinhoe, F.Z.S.

Psittacidæ.

1. Palæornis rosa, Bodd.

P. bengalensis, Briss.
P. cyanocephalus, L.
P. flavicollaris, Frankl.; Jerdon, Birds of India, i. p. 259.

Two pairs of this species were shot, out of a flock in autumn near Canton, by Dr. Dod, two of which were kindly given me by that gentleman for identification. This is the only well-authenticated instance of the occurrence of any of the Parrot-group in China. The Chinese call all Parrots "Ying-ko," and import various species from the Straits as cage-birds.

Falconidæ.

2. Aquila heliaca, Savigny.

A. imperialis, Cuv.
A. mogilnik, Gr.; Bp. Consp. Av. p. 13.

An immature male of this species was shot at the close of 1861, near Foochow, by Mr. A. Andrews. The specimen was identified by Mr. J. H. Gurney. I have lately received a letter from Mr. Andrews informing me that he had this last winter shot another Eagle, a female, probably of the same species as the first, at Foochow.

3. Haliaëtus albicilla, L.

Hab. Amoorland (v. Schrenck, Amurland, p. 223).

Captain Blakiston's expedition-party shot one on the 23rd of February at Chinkiang, on the Yangtsze, the head and leg of which were brought home and identified by Mr. J. H. Gurney. I once saw a large Sea-Eagle in the month of December at Amoy, which I believe to be of this species; and I was assured of its occasional

occurrence during the same season at Hongkong by the late Dr. Harland, a most diligent and accurate observer, whose collections in the various branches of natural history at present enrich the Museum of Scarborough, his native place.

4. HALIAËTUS PELAGICUS, Pall.

Hab. Sea-coasts of the Amoorland, Mantchuria, and Japan. Not hitherto observed in China.

5. PANDION HALIAËTUS, L.

Hab. Amoorland (v. Schrenck) and Japan. Abundant on all the rivers and bays of Formosa and China. The Chinese and Formosan specimens are rather smaller than those from Europe.

6. POLIORNIS POLIOGENYS, Temm.

Buteo pyrrhogenys, Schleg. Faun. Jap.

Originally described from Japan; since procured at Tientsin by Mr. Fleming, R.A. (see P. Z. S. 1862, p. 315; and The Ibis, 1863, p. 88).

7. BUTEO JAPONICUS, Schleg. Faun. Jap. t. 6; Bp. Consp. Av. p. 18.

Closely allied to the European Buzzard, but never acquires the dark plumage of the adult of that bird. Its tarsi, moreover, as Bonaparte remarks in his 'Conspectus Avium,' are more feathered. Found in Amoy, Hongkong, and Canton, in the winter only.

8. MILVUS MELANOTIS, Schleg.

M. govinda, Sykes, of some of my lists of Chinese Birds in The Ibis.
M. niger, var. *melanotis*, von Schrenck, Amurland.

Found throughout China, from Canton to Talien Bay, in the Amoorland, in Japan, and in Formosa.

9. FALCO SACER (Schleg.), Bp. Consp. Av. p. 24.

Procured by myself at Pekin (see The Ibis, 1863, p. 88).

10. FALCO PEREGRINUS, L.

Occurs from Canton to the Amoor. Found also in Japan and Formosa.

11. FALCO SUBBUTEO, L.

Found in Amoorland, according to v. Schrenck. I have seen specimens from Tientsin, Hankow (Central China), Foochow, and Amoy.

12. FALCO VESPERTINUS, L.

Found in Amoorland (v. Schrenck), in Talien Bay, and in the neighbourhood of Pekin.

13. FALCO ÆSALON, L. Merlin.

I have seen specimens from Pekin, Amoy, and Foochow.

14. TINNUNCULUS JAPONICUS, Schleg. Faun. Jap. t. 1, 1*a*; Bp. Consp. Av. p. 27. Japanese Kestrel.

Common in South China and Formosa; somewhat rare about Pekin. The Kestrel mentioned by v. Schrenck as occurring somewhat scantily in Amoorland is probably the same. I have, however, one specimen from Amoy, in which the colours are lighter and clearer, and the back considerably less spotted, as in the *T. alaudarius* of Europe.

15. ASTUR PALUMBARIUS, L. Goshawk.

This bird is found in the neighbourhood of Pekin. I have there seen it carried on the wrist by natives for the purposes of hawking. It is noted by von Schrenck as found in Amoorland.

16. ACCIPITER NISUS, L. Sparrow-Hawk.

Occurs from Canton to the Amoor; also in Japan.

17. MICRONISUS SOLOËNSIS, Horsf.

Falco cuculoides, Temm. Pl. Col. 110, 129; Bp. Consp. Av. p. 33.

I have seen specimens from Amoy, Foochow, and Tientsin. A good mark of distinction in this species, as pointed out by Mr. J. H. Gurney, is the clear unspotted cream-colour of the axillaries.

18. MICRONISUS GULARIS, Schleg.

I have seen skins from Amoy and Formosa. It inhabits also Japan, whence originally described and figured in the 'Fauna Japonica.'

19. MICRONISUS STEVENSONI.

Accipiter stevensoni, Gurney, Ibis, 1863, p. 447, pl. 11.

A resident species at Hongkong, Canton, and Macao. One specimen received from Tientsin.

20. CIRCUS CYANEUS, L.

From Canton to the Amoor.

21. CIRCUS SWAINSONII, A. Smith.

C. pallidus, Sykes.

A female specimen of this was procured by Captain Blakiston on the Yangtsze, and identified by Mr. Gurney.

22. CIRCUS MELANOLEUCUS, Pennant.

Procured by Mr. Fleming, R.A., at Tientsin. Probably extends throughout the interior of China, as it is common in the plains of Hindostan.

23. CIRCUS SPILONOTUS, Kaup; Swinhoe, Ibis, 1863, p. 213, pl. 5.

Found in South China; especially abundant in the neighbourhood of Amoy. Has also been procured from Singapore and the Philippines.

STRIGIDÆ.

24. ATHENE CUCULOIDES, Vigors; Bp. Consp. Av. p. 40.

From Canton to Ningpo.

25. NINOX JAPONICUS.

Strix hirsuta japonica, Schleg. Faun. Jap. t. 9; Bp. Consp. Av. p. 41.

From Amoy to Tientsin; found also in Formosa. Originally described from Japan.

26. KETUPA CEYLONENSIS, Gmel. Crab-Owl.

Procured only from the hills of Hongkong. Abundant in Ceylon and in many parts of India.

27. SCOPS SEMITORQUES, Schleg. Faun. Jap.

S. lempiji, var. *lettia*, Hodgs., Blyth's Catalogue.

South China; as yet only traced from Canton to Foochow, thence across to Formosa. Also in Japan, and throughout the hilly regions of India. Is replaced in the Malayan peninsula by the allied *S. lempiji*, Horsf.

28. SCOPS JAPONICUS, Schleg.; Bp. Consp. Av. p. 48.

S. bakkamœna, Penn.

From Canton to Peking; also in Japan. Occurs in South China in winter, and is found in Tientsin during summer. I procured it at Amoy twice, and have seen it on several occasions in winter only, and Captain Blakiston procured one at Canton on the 15th of November; hence I infer it to be a bird of passage, spending the summer in North China and Japan, and wintering in South China. Is probably the same as the bird of Hindostan, *S. bakkamœna*, Penn.; at least it has been so identified by Mr. E. Blyth.

29. BUBO MAXIMUS, Sibbold. Great Horned Owl.

B. atheniensis (Aldrov.), Bp. Consp. Av. p. 48.
Strix bubo, L.; von Schrenck, Amurland, p. 249.

From Canton to Talien Bay, and thence on to the Amoor. In many parts of China it is by no means rare throughout the year.

30. OTUS VULGARIS, Flem. Long-eared Owl.

Otus vulgaris, Bp. Consp. Av. p. 50.
Strix (*Ægolius*) *otus*, L.; v. Schrenck, Amurland, p. 246.

Procured by Mr. Fleming at Tientsin. Found in Amoorland (v. Schrenck), and more or less common in many parts of China proper.

31. OTUS BRACHYOTUS (Gmel.). Short-eared Owl.

Brachyotus palustris, Bp. Consp. Av. p. 51.
Strix (*Ægolius*) *brachyotus*, v. Schrenck, Amurland, p. 246.

From Canton to the Amoor.

32. Syrnium sinense, Lath.; Bp. Consp. Av. p. 52.

Said to have been received from Canton. I have never come across the bird.

Caprimulgidæ.

33. Caprimulgus jotaka, Schleg.

C. dytiscivorus, Swinhoe, Ibis, 1860, p. 130.
C. swinhoii, Blyth.

Tarsi feathered; allied to *C. europæus*, L.

Summers in North China and Japan; common in South China, chiefly in spring and autumn; when in its migration it spends two months in Amoy and Hongkong. Old birds very black, with much less buff markings. White spots on the primary quills of male very variable in size. White band on tail also variable in breadth, and at different distances from tip in different specimens. In the freshly moulted males both are strongly tinged with buff.

The female has no band across the tail, and the spots on the underneck and wings are rust-coloured instead of white. Her whole plumage is much more rufescent.

Both sexes in the very young plumage have no spots on the wings or tail, the throat of the male alone showing whitish patches.

34. Caprimulgus stictomus, Swinhoe, Ibis, 1863, p. 250.

Tarsi bare; allied to *C. monticola* of India and *C. affinis* of Java. Outer tail-feathers in male white. Spends the summer in the south of China; found near Amoy in September and October. Amoy specimens very rufescent and clearly marked. Formosan variety smaller and very pale.

Cypselidæ.

35. Acanthylis caudacuta, Lath.

Hirundo fusca, Shaw.
Chætura australis, Steph.
C. macroptera, Sw.
C. nudipes, Hodgs.
Cypselus leuconotus, Deless.
Hirundo ciris, Pall. Zoogr. Ross. Asiat. p. 541.

Most naturalists are, I believe, now agreed that the Himalayan and Australian birds are one and the same species, and identical with the individual that was shot in England. In the south of China I never saw but one pair; the male I secured. This specimen agrees entirely with Australian skins. Von Schrenck observed this Swift in Amoorland; and it is doubtless the bird described by Pallas as *Hirundo ciris*.

36. Cypselus vittatus, Jard. & Selb. Ill. Orn. n. s. t. 39.

Closely allied to *C. pacificus*, Lath. (*C. australis*, Gould). Sexes of similar plumage; wings and tail of variable length in both, in the former seldom more than ½ inch difference between two specimens.

Found as a summer visitant in China, from Amoy to Talien Bay; also in Formosa. Not noticed in von Schrenck's 'Amurland.'

37. Cypselus subfurcatus, Blyth, J. A. S. xviii.

C. affinis, var., Strickland, P. Z. S. 1846, p. 99.

Larger than *C. affinis*, J. Gr., and of a much blacker and glossier colour, with much more white on the throat; tail longer and subfurcate. Approaches *C. vittatus* more nearly than *C. affinis* does. Sexes alike. Wings vary somewhat in length in individuals. Resident on the Chinese coast not much higher than Amoy, whence it ranges southwards to Malacca. Found also in southern Formosa.

Upupidæ.

38. Upupa epops, L.

U. vulgaris, Pall.

A resident bird throughout China, from Canton to Talien Bay. Found also in Amoorland, according to von Schrenck. Chinese specimens identical with the European bird. Some individuals are strongly imbued with a rufous tinge. The young are at once distinguishable by their much shorter bills. Builds in holes of walls and exposed Chinese coffins. The younglings call for food with a hissing note. The male during the breeding-season utters its song of love, "Hoo-hoo-hoo." To produce these notes the bird draws the air into its trachea, which puffs out on either side of the neck, and the end of the bill is tapped perpendicularly against a stone or the trunk of a tree, when the breath being forced down the tubular bill produces the correct sound. I have watched a male crying on a rope, where, instead of striking its bill, it merely jerked its head. The song then given forth was quite different, sounding more like "hoh-hoh-hoh." Feeds on worms, for which it stamps the ground with its feet, clutching them by the head with its bill. It bruises the worm by beating it against the ground, and then, throwing up its head, jerks it down to its small mouth, and finally swallows it.

Cuculidæ.

39. Eudynamys orientalis.

Cuculus orientalis, niger, mindanensis, et *scolopaceus*, L.
C. maculatus, Gmel.

A summer visitant to the extreme south of China; common about Canton. I have a specimen from Swatow; but I do not think it ranges much higher. I have never found it at Amoy. For an account of the bird as observed at Canton, see The Ibis, 1861, p. 46.

40. Cuculus canorus, L.

I have a series of each of two forms from China, both of which Mr. Blyth refers to *C. canorus*. I have a skin from Tientsin, one from Peking, and a third from Foochow—all undoubtedly true *C. canorus*, with white underparts banded with narrow bars, and the axillaries

also similarly banded. On the Foochow hills I have heard the true Cuckoo-note in June. Of the second series, I have one from Tientsin, and four from Amoy. These are of similar form, with fulvescent under parts banded with much broader bars more widely set, with the axillaries nearly barless. One has a somewhat large bill, and two are almost entirely blackish brown in the parts which should be grey. I have never heard the notes of the race that touches in greatest abundance at Amoy in its migrations, and therefore will not attempt at present to separate it. It may be found, on further acquaintance, worthy of specific distinction. This variety is not noted in Jerdon. The true Cuckoo is very variable in tints, length of wing, and size of bill, and even in my small series leads away to the following allied forms (which, however, differ from it in note) in such a manner that I can hardly help thinking that the various races interbreed, the offspring probably studying the note of that parent to which its inherited form most assimilates, and to the society of which it is on that account attracted. The straggler which I procured in south-west Formosa belongs to the second variety.

41. Cuculus himalayanus, Vigors (not of Gould's 'Century,' which=*C. poliocephalus*, Lath.).

C. saturatus, Hodgs.

I have an individual of this Cuckoo, shot at Amoy on its vernal northward migration. It has been identified by Mr. Blyth, and answers well to Jerdon's description (Birds of India, i. p. 323). It is of similar form to *C. canorus*, but is smaller and much more deeply and brightly coloured. I have never observed it alive; but some remarks on its habits and peculiar note are given in the work referred to.

42. Cuculus micropterus, Gould.

Of this I have also one shot at Amoy, in the neighbourhood of which place it is frequently seen and heard in spring. It is a plain-dressed species, with very broad and widely set bars on the under parts; smaller than *C. canorus*, with rather a large bill (see Jerdon, Birds of India, i. p. 326, where an account of its note and habits are given).

43. Cuculus hyperythrus, Gould.

I have only an immature bird, from Shanghai, the locality whence Mr. Gould procured his typical specimen. This is a much more powerful bird than *C. canorus*, with short wings and heavy bill. The plumage of my bird is brown on the upper parts, with the yellowish mottling of immaturity. The under parts are fulvous, barred at long intervals with black, but there are deep-rust-colour indications of a change into what should be the plumage of the adult bird.

44. Hierococcyx fugax.

Cuculus fugax, Horsf. Linn. Trans. xiii.
Cuculus sparverioides, v. Schrenck, Amurland, i. p. 24, t. 10.

This abnormal form of Cuckoo, with peculiar bill and somewhat graduated tail, is ably described by von Schrenck in the work above noted, but wrongly referred to the much larger Himalayan type. It is also noticed in Jerdon's 'Birds of India,' p. 331. I have seen it in Hongkong in April; but have, unfortunately, only one individual in hepatic or rufous plumage from Manilla, and must therefore direct my readers to von Schrenck's work, with the caution, however, that the bird there figured is not in the plumage of the adult. This species of Cuckoo is, curiously enough, spotted and streaked instead of being barred on the under parts. I have to thank Mr. Blyth for drawing my attention to Dr. Horsfield's type specimen in the E. I. C. Museum, from the Straits, which appears identical with our bird.

45. POLYPHASIA TENUIROSTRIS.

Cuculus tenuirostris, Gray.

A summer visitant to the south of China, though some few stay very late. I have an adult male, shot at Amoy on the 9th of December 1857. Chinese specimens agree almost entirely with those from India; but their tints are usually of a higher tone, the grey runs lower down on the breast, the under parts are more brightly rufescent, there is much more whitish on the edge of the carpus, and much less white on the under wing. The bills and wings of my specimens vary somewhat in length. Like the larger Cuckoos, this bird in the adult plumage often exhibits bars of red on the upper parts; and frequent cases of the rufescent or hepatic plumage occur. I have one adult male which is of a fine chestnut-red on the upper parts barred with bronze-black, the under parts being rufous barred with black and white. One specimen in the partial hepatic plumage has an admixture of grey on the lower parts, showing a tendency to the allied *P. nigra* of Hindostan. The notes of the Indian *P. tenuirostris* would appear, according to Jerdon, to differ from those of our summer visitant.

46. CENTROPUS VIRIDIS, Scopoli.

C. bengalensis, Gmel.
C. lepidus, Horsf.
C. affinis, Horsf.
C. tolu, Raffles.
C. pumilus, Lesson, &c. (see Jerdon, Birds of India, i. p. 350).

This small Lark-heel is a resident species in South China, being chiefly confined to islands. It is somewhat rare on the main, where the large species abounds. In Formosa it is the only species. (See The Ibis, 1861, p. 48.)

47. CENTROPUS RUFIPENNIS, Illiger.

(For synonyms, see Jerdon, Birds of India, i. p. 348.)
C. sinensis, of my "Canton List," Ibis, 1861, p. 49.
C. eurycercus, A. Hay.

The large Lark-heels from India, Malacca, and China have been

considered as three distinct species. The first I have received from Mr. Blyth, the second from Siam through the kindness of Sir R. Schomburgk, and I have a large series from Canton and Foochow. In size, form of bill, and proportion of wings and tail-feathers, the bird is as variable as in the distribution of black bars on its upper plumage. I have skins showing quite as narrow tails as in *C. rufipennis* of India, and others displaying even broader rectrices than in the *C. eurycercus* from Siam. I have thus been compelled to unite them together. The habits as well as the notes of the species observed by myself tally closely with Jerdon's remarks, with the exception of what he states of the nest. I have never found the nest domed as is that of *C. viridis*. It is shaped like a long narrow basket, made almost entirely of fresh grass, suspended in the centre of a thick hedge, and usually contains four pure-white eggs, ovate and not roundish as those of its small ally. This Crow-pheasant is a resident bird in South China, ranging a few hundred miles above Foochow, —not quite so far north, I think, as Ningpo.

Picidæ.

48. Yunx torquilla, L.

Yunx japonica, Bp. Consp. Av. p. 112.

Summers in North China, the Amoor, Kamtschatka (v. Schrenck), and Japan, and winters in South China, at which season it is very common at Amoy. Lives almost entirely on ants. Specimens very variable as to tints, spots, and markings. This Eastern form is rather smaller, and offers a few peculiarities distinguishing it from the European bird, but scarcely sufficient to cause it to be recognized as anything more than a race of the European type.

49. Micropternus fokiensis, Swinhoe, P. Z. S. 1863, p. 87.

Allied to *M. phaioceps*, Blyth, of India, and *M. badius*, Raffles, of Java, which form Bonaparte and Malherbe's genus *Phaiopicus*. Procured at Foochow, where it is a resident species, and probably extends throughout Southern China. I may here remark that a Sumatran specimen received from Professor Schlegel, labelled *P. brachyurus*, Vieill. (*P. badius*, Horsf.), is much larger than my Malacca specimens so named by Mr. Blyth, and has the throat strongly mottled with blackish brown, as is the *M. gularis*, Jerdon, of South India and Ceylon; but the various brown species with red spotted cheeks in the male are so intimately connected by intermediate forms from intermediate localities, that, like the *Picus major* group, they cannot be regarded as more than local races. *M. badiosus*, Temm., of Borneo, which I have also received from Professor Schlegel, seems however to establish its own distinctness by the red markings of the male extending in specks to the eyebrow and occiput.

50. Gecinus canus, Gmelin.

Picus chloris, Pallas.

North China, about Pekin, where common; also Amoorland (v. Schrenck).

51. GECINUS GUERINII, Malherbe.

Originally described from specimens from Shanghai. Procured by Captain Blakiston on the Yangtsze, near Shanghai. Differs chiefly from *G. canus* in its smaller size, in its deeper and more olive plumage, in its larger frontal red patch, and in having a black-marked occiput.

52. GECINUS TANCOLA, Gould, P. Z. S. 1863; Swinhoe, Ibis, 1863, p. 389.

Allied to *G. occipitalis*. The young in the nest are similar to their parents in colour and markings, showing the usual sexual distinction; in this respect they differ from *G. viridis*, which has an immature dress. I have a young pair (male and female) taken, with the male parent, from a tree on the Pehling Mountains, near Foochow. This species ranges over the higher hills of South China and Formosa.

G. guerinii, from an intermediate locality, is quite intermediate between this and the true *G. canus*. In *G. canus* the black on the crown shows itself in faint streaks; in *G. guerinii* it becomes marked, and extends in a patch to the occiput; in *G. tancola* it is much more extensive. In the same way the black moustache-streak, indistinct and disconnected in the first, is more connected in the second, and in the third a broad black line. In fact, part with part compared, the entire plumage of *G. guerinii* takes an intermediate position between the two. Nevertheless specimens of *G. canus* from Pekin are identical with European specimens, and show the barred immature plumage.

53. PICUS MANDARINUS, Malherbe.

P. luciani,
P. gouldii,
P. cabanisi, } Malherbe, Mon. Picidæ.

For remarks on this group of Chinese Woodpeckers, see P. Z. S. 1863, p. 88. Races of this variable bird are found throughout China, from Canton to Pekin. The further north they extend the whiter and more spotted they become, until the Amoorland is reached, where von Schrenck reports the form identical with *P. major* of Europe.

54. PICUS SCINTILLICEPS, Swinhoe, Ibis, 1863, p. 96.

Belongs to the spark-headed group of small Pied Woodpeckers, of which numerous species are recorded. Common about Pekin. A smaller and browner species occurs in Japan (the *P. kisuki* of the Faun. Jap.); and the form is represented in Formosa by a species allied to the Chinese bird—my *P. kaleënsis* (see The Ibis, 1863, p. 390).

55. PICUS HYPERYTHRUS, Vigors, var. POLIOPSIS, Swinhoe.

Abundant near Pekin. The Chinese bird is too close to that of the Himalayas to be considered more than a variety of that bird (see

Ibis, 1863, p. 96). Its back is more barred with white, and it has less rufous on the sides of the neck.

CAPITONIDÆ.

56. MEGALÆMA VIRENS, Bodd.

Bucco grandis, Gmel.

Inhabits wooded hills of Southern China, and the Himalayas. I have received specimens from the neighbourhood of Foochow, and Captain Blakiston shot it on the 16th of March near Canton.

ALCEDINIDÆ.

57. HALCYON SMYRNENSIS, L.

H. fuscus, Jerdon, Birds of India, i. p. 224.

A common resident species from Canton to the River Yangtsze.

58. HALCYON ATRICAPILLA, Gmel.

H. pileata, Gray ex Bodd.; Bp. Consp. Av. p. 155.

Also a resident species from Canton to the Yangtsze.

59. ALCEDO BENGALENSIS, Gmelin.

A. ispidioides, Lesson.

Found throughout Eastern Asia to the Amoor, in Japan, and in Formosa. In the female the plumage is not so brilliant; but the chief sexual distinction is her pale-yellowish-red under mandible, which is always black, like the rest of the bill, in the male and young bird. This I have found a constant character in the Chinese bird, but I do not see it remarked in Jerdon's account of this species, nor yet in v. Schrenck's 'Amurland.' The bill of the young bird is tipped paler; its breast is washed with a dingy bluish grey, almost black in some individuals; the rufous has only a slight admixture of yellow; and the upper plumage is paler and dingier. I suspect that the mandibular distinction of the female will also be found to hold good in the European *Alcedo ispida*, L., and I would call the attention of British ornithologists to the fact.

60. CERYLE RUDIS, L.

Found about all rivers in South China from Canton to Foochow; does not extend so far north as Shanghai. The males carry two bands across the breast. In very mature males the throat and underneck are spotted thickly with round black spots. In spots and particular markings my specimens vary a good deal.

CORACIIDÆ.

61. EURYSTOMUS ORIENTALIS, L.

A summer visitant to Southern China; procured at Canton and Foochow. At the latter port a male used to perch for the greater part of the hot spring days on the top of a flagstaff, whence it

uttered its loud unmusical notes, springing at intervals into the air, and after throwing a somerset returned to its post. This action was not performed in the pursuit of insect food, but apparently in play. For a further account of its habits see The Ibis, 1861, p. 31.

CERTHIIDÆ.

62. TICHODROMA MURARIA, L.

A specimen of a bird answering to this was shot by Mr. Consul Gingell on the mountain-plateau near Foochow during winter. The bird was accurately described to me by that gentleman, but I did not see the specimen. I have never met the bird myself in China.

Certhia familiaris, L., is given from Amoorland and Japan. We should therefore expect to meet with it in North China.

PARIDÆ.

63. PARUS MINOR, Schleg. Faun. Japon.; and

64. PARUS CINEREUS, Vieill.

The first of these is the form found in Japan and from Chefoo (Shantung promontory) down to Foochow. It is easily distinguished from the second by its greenish-yellow back and its smaller bill. *P. cinereus* is the form ranging over India and its archipelago, and has a grey back. In Amoy we get the typical *P. minor*, and others with grey backs, resembling the *P. cinereus*, but with the smaller bill of *P. minor*. Between these two every stage of yellow and grey back can be procured out of the same party of Tits. In Canton occasional specimens of true *P. cinereus* occur, but the most ordinary form is the variety oscillating between the two species. Most Canton specimens have, however, larger bills. I have never seen the typical *P. minor* shot so far south as Canton; and Mr. Blyth tells me that he has never heard of the yellow-backed form being found in the Indian countries. Hence it is but fair to consider the two extreme forms as good species, and allow that they interbreed on the boundaries of their respective localities, and blend into one another gradually and almost imperceptibly. The large *P. major*, L., is said by Pallas to extend throughout Siberia to Kamtschatka.

65. PARUS KAMTSCHATKENSIS, Bp.

P. borealis, Selys?.
P. palustris, var. *borealis*, von Schrenck, Amurland.
P. palustris, Swinhoe, Ibis, 1861, p. 331.

This form of the Marsh-Tit prevails from Peking to Amoorland. I have met no Marsh-Tit in South China. It has also been procured from Hakodadi, Northern Japan.

66. MECISTURA CAUDATA, L.

Mr. Gould remarks that Japanese specimens of the Long-tailed Tit closely resemble British specimens, which offer variation from those procured in continental Europe; while von Schrenck found

those from the Amoorland so similar to European birds that he has set them down as identical. I have no specimens with me, but I observed the form common about the plantations at Shanghai in July 1857. I have never met them further south in China. Captain Blakiston met them at Shanghai in January; hence we may infer that in that neighbourhood at least they are a resident species, or found both winter and summer.

67. SUTHORA WEBBIANA, G. R. Gray, P. Z. S. 1852, p. 70.

First procured by Mr. Webb near Shanghai. Captain Blakiston met with it in large companies at Shanghai in January. He says they hang about the twigs like Tits. I have never come across the bird.

ALAUDIDÆ.

68. MELANOCORYPHA MONGOLICA.

Alauda mongolica, Pall.

Frequents the Mongolian desert near Pekin, and is kept as a cage-bird throughout China (see The Ibis, 1861, p. 333).

69. CALANDRELLA PISPOLETTA, Pall.

Alauda pispoletta, Pall.

Cultivated fields of Talien Bay, North China (see The Ibis, 1861, p. 255). These have more conical bills and longer tails than the European *C. brachydactyla*, and are doubtless referable to Pallas's species from Siberia.

70. ALAUDA ARVENSIS, L.

A. pekinensis, Swinhoe, P. Z. S. 1863, p. 89.
A. japonica, Swinhoe, Ibis, 1861, p. 333; 1863, p. 94.
A. arvensis, von Schrenck, Amurland, &c., i. p. 273?.

The Skylark is abundant about Peking, and ranges into Amoorland, whence von Schrenck procured specimens. I have, since describing it as peculiar, seen specimens, shot in England, in Mr. Tristram's collection identical with my skins from Peking.

71. ALAUDA CANTARELLA, Bp.

A. intermedia, Swinhoe, P. Z. S. 1863, p. 89.

This is the Lark that abounds in the valley of the Yangtsze and Shanghai. It is intermediate between the above and the following. This bird was first procured by Prince Bonaparte at Florence. Mr. Tristram has one, shot by himself in Geneva, which is identical in every way with the Shanghai bird. It is difficult to believe that this form extends right across the vast continent, maintaining its distinctness from *A. arvensis* throughout; but it seems rather that the operation of similar causes in the extreme west and east has produced the same form.

72. Alauda cœlivox, Swinhoe, Zoologist, 1860.

This is a small Lark common from Canton to Foochow, and in Formosa. My specimens from the latter place are more largely spotted on the back, and the streaks on the breast are much broader and numerous, but they are otherwise so similar that they can only be regarded as a race.

73. Galerida leantungensis.

Alauda leantungensis, Swinhoe, Ibis, 1861, p. 256.

Common about the hills of cultivated valleys of Talien Bay, North China. A species of crested Lark is noticed by Pallas as *Alauda galerita* from Dauria.

74. Otocorys alpestris, L.

O. penicillata, Gould.
O. scriba, Bp.
O. albigula, Brandt.

A specimen was procured by Mr. Fleming at Tientsin (see The Ibis, 1863, p. 95). Von Schrenck notes a bird of this genus as the *O. alpestris*, L., from Amoorland. I have compared mine, in company with Mr. Tristram, with a specimen of *O. alpestris* of Europe, and we can find no difference. All the species of this genus appear to get yellow faces in the breeding-season.

75. Corydalla richardi, Vieill.

C. sinensis, Bp.
Anthus thermophilus, Hodgs., of my previous lists.
C. infuscata, Blyth.

I have a very large number of this species, shot at Amoy and elsewhere in China, Siam, and India. It is in South China a winter bird, but a few remain about the hills to breed. I found a few on the Foochow hills in June; these were smaller, with larger bills and legs, and darker and more distinctly marked plumage. I sent one to Mr. Blyth, who, under the impression that it came from the Philippines, christened it under the new name *C. infuscata*. But between this and the ordinary winter race I have every gradation of form and plumage. I also procured in spring at Amoy a few specimens of a somewhat smaller Pipit, richly washed with ochreous; this is Bonaparte's species *C. sinensis*, and, if correctly identified by Mr. G. R. Gray, *Anthus thermophilus*, Hodgs. But here again in my large series every step both in form and colour occurs between it and the larger pale race. It is easy to conjecture how these different climatic races of the same bird should turn up at one spot. For the island of Amoy by its position affords a resting-place to vast numbers of birds bound on widely different migrations; and the different groups of the Richard's Pipit, influenced in their forms and tints by the greater or lesser heat of their birth-places and summer resorts, and doubtless by other local causes, in passing to their winter

quarters rest for a few days on our island. The large pale variety stays the cold season with us; the rich-tinted variety arrives early, passes away, and returns late, thence showing that it has a long way to travel southwards. The intermediate forms are less regular in their movements. As the nesting-area is found to be more fixed than their winter haunts, the same birds returning to breed year after year to the same spot, it is not improbable that the extreme forms of these races would be found to inhabit in summer areas widely divided, the intermediate gaps being filled up with forms intermediate and approximating most nearly to those to which they were nearest, until amalgamation would ensue.

76. ANTHUS (AGRODROMA) GUSTAVI, Swinhoe, P. Z. S. 1863, p. 90.

Touches at Amoy during the first fortnight of May, bound from the south into the interior of Central China.

77. ANTHUS BLAKISTONI, Swinhoe, P. Z. S. 1863, p. 90.

Allied to *A. obscurus*, Gmel. Procured by Captain Blakiston on the Yangtsze. A species referred to *A. aquaticus* is noticed by von Schrenck from Kamtschatka; and the same is also given by Schlegel from Japan. These may be identical with our species.

78. ANTHUS CERVINUS, Pall.

A winter bird in South China and Formosa, which passes the summer in Kamtschatka and the northern regions. Von Schrenck does not notice it in Amoorland. Flocks pass over Amoy as late as the first week in May; these are probably arrivals from the Indian Archipelago, whence specimens in winter plumage have been received. Before leaving us the bird undergoes an entire moult, when the eyebrows, throat, and breast show a pale vinaceous mixed with more or less ochreous, but unspotted. As the nuptial season comes on, the silvery tinge intensifies into a uniform dusty vinaceous, which encroaches further on the lower parts. I have a fine series showing every gradation between the pale-spotted winter and the fine nuptial dress.

79. ANTHUS JAPONICUS, Schleg.

This is said to occur in North China and the Amoor, but I have never procured any specimens of it. I have a strong suspicion that it is only the winter dress of *A. cervinus*.

80. ANTHUS AGILIS, Sykes.

This Tree-Pipit stays the winter in the south of China, and summers in the north, Amoorland, and Japan. The birds from the two last have generally been noted by writers as *A. arboreus*; and Bonaparte, in his 'Conspectus,' remarks on the Japanese form as "*vix distinctus*." Our bird is the same as the Indian *A. agilis*, and can scarcely be regarded as more than a race of the European *A. arboreus*.

81. BUDYTES FLAVA, L.

B. cinereocapilla, Savi.

Our Amoy and South-China bird moults in summer into the true European *B. flava*, with grey head and cheeks, white eyebrow and chin. Those received from Tientsin (North China) in nuptial dress have the entire head grey, and are almost undistinguishable from *B. cinereocapilla*. *B. cinereocapilla* was procured in October at Canton by Captain Blakiston. The Formosan varietv retains the head green, with a yellow eye-streak, as the *B. rayi* of Great Britain, but differs in having dark olive cheeks. According to von Schrenck, in Amoorland the true *B. flava* occurs, and not the grey-headed *B. cinereocapilla*. In the Malayan Archipelago, I am told, the green-headed variety occurs, but with dark, almost black cheeks; and I suspect that the true British form, with yellow cheek-spot, will turn up at Japan, at which most of the European birds that extend to East Asia undergo a similar change in plumage to what takes place in British forms as compared with those of Europe. I would draw attention to the fact that the Japanese climate is affected by the Pacific Gulf-stream in a manner corresponding to the influence exercised over the British Islands by Maury's "River in the Ocean;" and doubtless the similarity of climate so caused is at the root of this similarity of variation.

82. MOTACILLA (PALLENURA) BOARULA, L.

M. (*Calobates*) *sulphurea*, Bechst.
M. melanope, Pall.

Found throughout China and Formosa, the Amoor, and Japan. Is more a vagatory than a migratory species, and is found at all seasons in the south of China.

83. MOTACILLA LUZONIENSIS, Scop.

M. alba, var. *paradoxa*, von Schrenck.
M. leucopsis, Gould, P. Z. S. 1837, p. 78.
M. alboides, Hodgs. As. Res. xix. p. 190.

This white-faced Pied Wagtail is a common species throughout China and Formosa, extending into Amoorland. It is also found throughout India and its archipelago, as far as the Philippines. The young are yellowish olive-grey on the upper parts and breast, and have the white of the body more or less washed with ochreous. The male in summer plumage has the occiput and upper parts glossy black, the black of the breast extending nearly to the chin. In winter large flocks of this species visit South China from the north, but a fair number spend the entire year with us. Cognate to *M. alba*, but smaller, and with much whiter wings.

84. MOTACILLA LUGUBRIS, Temm.

85. MOTACILLA JAPONICA, Swinhoe.

86. MOTACILLA OCULARIS, Swinhoe.

Under the term *M. lugens* seu *lugubris* there has been a confusion of the races of the Pied Wagtails with black eye-streaks, which I have been at some pains to clear up. The difficulty began with Temminck, who, in his 'Manuel d'Ornithologie,' p. 175, described Pallas's Russian species from Japanese examples. He there gives the summer plumage as having the *forehead white*. At a later date Professor Schlegel refused to acknowledge the existence of Pallas's species as a European bird. Pallas, however, procured his typical specimens, as he tells us, from the shores of the Black Sea; and it has since been brought by officers from the Crimea, and by Mr. Tristram from Egypt. One of Mr. Tristram's two specimens (both of which I have carefully examined) has been figured in Mr. Bree's work on the Birds of Europe. I have no hesitation, therefore, in applying Pallas's name to the race or species found in Western Asia adjoining Europe. Middendorff (Sib. Reis.) applies Pallas's name to the Wagtail of Amoorland, which, from his description, is identical with the bird found throughout China, of which I possess numerous examples in all plumages from Amoy, and one adult summer male from Tientsin. This permanently grey-backed race I have named *M. ocularis*. In Japan a race occurs similar to the Chinese bird, in having the broad white forehead, but resembling the *true M. lugubris* in its summer black back. The following diagnosis will, I think, serve to distinguish the three races or species.

(1.) MOTACILLA LUGUBRIS, Temm.

M. albeola, var. *lugens*, Pall.

From two specimenss hot by Mr. Tristram, 2nd February 1860, in Egypt. The pectoral band incomplete, showing the birds to be in winter plumage. *Forehead black; upper parts blackish brown, with no indications of bluish grey; the primaries are white for only one-third at their bases, and the lateral tail-feather is entirely white.*

Hab. Shores of Black Sea; Odessa; Turkey; Egypt (in winter).

(2.) MOTACILLA JAPONICA, Swinhoe.

M. lugubris seu *lugens*, Temm. & Schleg. Faun. Jap.

The adult summer plumage of this race has been correctly figured in the 'Fauna Japonica.' *The forehead is always white; greater part of primaries pure white, but the white lateral tail-feathers with a black inner edge.* In winter its back becomes smoke-grey, but always more or less patched with black, with a black shoulder.

Hab. Japan; straggles to the China coast in winter.

(3.) MOTACILLA OCULARIS, Swinhoe.

M. alba, var. *lugens*, von Schrenck & Midd.

M. albeola, var. *kamschatica*, Pall.

Back, scapulars, and shoulder-patch perennially light French grey; quills more or less broadly edged with white, never so entirely white as in foregoing; lateral white tail-feathers broadly edged interiorly with black. In summer the breast blackens to the bill,

leaving however the cheek and side of neck white as before; the plumage remains otherwise the same.

Hab. Eastern Siberia; China; Formosa; through Amoorland to Kamtschatka. Some stay all the year in South China and Formosa.

From the appearance of Mr. Tristram's specimens, it strikes me that the true *M. lugubris* in summer has the entire head and neck black, leaving only the white eyebrow. If this be the case, it would be more nearly affine to *M. maderaspatana*, Briss., of Hindostan, from which, however, it differs in its smaller size and in the different distribution of white on its wings. I am strongly of opinion that its affinities are, strictly speaking, rather with this South Asiatic form, and not with the East Asiatic species, both of which have broad white foreheads, and in full summer plumage the cheeks and sides of neck white. In winter our two Eastern species can always be distinguished from *M. alba* and cognate races by the black eye-line. In that season *M. lugubris* and *M. maderaspatana* approach our birds by retaining the black eye-line, but it is in them much broader, and their backs vary from a pale to a dusky brown, and have none of the blue-grey tint that is to a great extent acquired even by *M. japonica*. Bree is certainly wrong in the blue coloration of the back in his plate, for neither of Mr. Tristram's birds shows any trace of it. The rarity of the true *M. lugubris* in collections has doubtless led to all the confusion that exists; but whether we regard them as races or good species, it is worth while, for the sake of scientific accuracy, that these variations should be correctly identified and localized.

87. NEMORICOLA INDICA, Gmel.

Noticed by me near Pekin (Ibis, 1861, p. 333), and afterwards brought home from same locality by Mr. Fleming (Ibis, 1863, p. 94).

CINCLIDÆ.

88. HENICURUS LESCHENAULTII.

Turdus leschenaultii, Vieill.
Motacilla speciosa, Horsf.; Ibis, 1861, p. 265.
Enicurus coronatus, Temm. Pl. Col. 113.

Never observed by me in China except on the hills round Foochow, where I have procured it both in winter and summer. My specimens from that locality correspond entirely with Javan skins.

89. HENICURUS SCHISTACEUS, Hodgs. As. Res. xix. p. 190; Ibis, 1861, p. 409.

The only Chinese specimen I ever saw of this bird was procured in February 1861 by M. De Grijs, Netherlands Consul at Amoy, in the tea-hills some 150 miles inland of Amoy. The skin was, I believe, forwarded to the Leyden Museum. It was kindly lent to me, and I took down the following note from it:—"Bill black; legs and claws pale flesh-colour; upper parts slate-colour; a white streak crosses the forehead and runs over the upper half of the eyelid; nostrils, throat, and cheeks black; under parts pure white; smoke-grey on the flanks, and black under the shoulder; wings and tail

deep blackish brown; shoulder-edge, tips of greater coverts, spot on base of primaries, and tips of secondaries white; rump, two outer tail-feathers, and tips of the rest white." M. De Grijs told me that he saw these birds on the margins of pools on the hills, and that they frequently uttered twittering notes not unlike those of the Sandpiper (*Tringoides hypoleucus*), but louder. I compared the Chinese skin at the time with one from Burmah, received from Mr. Blyth, and could not find any noticeable difference between them.

90. Cinclus pallasii, Temm.

This is noted from Amoorland, Japan, and Formosa. I have therefore no hesitation in including it in my Chinese list, as it is sure to occur in the interior mountain-ranges.

91. Pitta nympha, Schleg. Faun. Jap. Supp. pl. A.; Ibis, 1861, p. 412.

I never procured but one specimen of this bird, and that was in June 1861 at Amoy; so that at present I cannot regard it as more than a straggler, probably from the extreme south of China. My specimen runs uncommonly close to *P. cyanoptera*, var. from Siam, which has the black crown-line separate from the nuchal bar. Mine has the black crown-line only indicated by a brown patch, and the white on its wings more extended. At the best I presume it can only be considered a race of the varying species *P. cyanoptera*. The Malacca race has the black crown-line united to the nuchal bar.

92. Myiophonus cæruleus, Scop.; Ibis, 1861, p. 36.

Common on all the retired rocky hills from Canton to Ningpo, where it is ever a constant resident. The males are a good deal larger than the females. It finds its nearest ally in the *M. temminckii*, Vigors, of Assam and Arakan, which is always distinguishable from our black-billed bird by its partly yellow bill. The group is represented in Formosa by a species of the subdivisional form *Arrenga*, hitherto only known from Java and the Neilgherries.

Pycnonotidæ.

93. Hypsipetes holtii, Swinhoe, Ibis, 1861, p. 266.

Very closely allied to *H. maclellandi*, Horsf. First procured at the Foochow hills. Has since been obtained on the Ningyang tea-hills near Amoy(see The Ibis, 1861, p. 409). Resident on the hills.

94. Ixos jocosus, L.

Gracula cristata, Scop.
Sitta chinensis, Osbeck.

In China not found north of Canton; about that city it is specially common (see The Ibis, 1861, p. 39). Our specimens appear identical with those from Calcutta. The young birds have a brown instead of a black crest, the lore and under the eye only being black, and the upper plumage generally is much lighter and mixed with

light yellowish red. The vent is brownish buff, with only a tinge of crimson, and the crimson eye-spot is entirely wanting.

95. IXOS CHRYSORRHOIDES, Lafresn.; Ibis, 1861, p. 39.

Crown of head black; under the eye, lore, and chin blackish brown; vent crimson. This is a common resident species in the south of China, from Canton to Foochow.

96. IXOS SINENSIS, Gm.

I. occipitalis, Temm.

A very common resident species from Canton to Foochow, and also in Formosa. The young of this species have the head a uniform colour with the back, which is light brown instead of grey; the rest of the colours are much paler. Among my series from Amoy I have one very curious variety, in which the white of the occiput and throat is of a fine clear smoke-grey. My specimens differ from one another chiefly in the development of the white occipital patch; some have it very large, and occupying a good portion of the head, while in others it gets encroached upon by the black, until in some specimens it almost entirely disappears. There is also a great variation in size, and length of wing and tail; but in the form and length of bill the difference is not so appreciable as I have found it in many species of birds.

97. SPIZIXOS SEMITORQUES, Swinhoe, Ibis, 1861, p. 266.

A resident species in the high plateau near Foochow. I have also procured it from the mountain-ranges of Formosa. The male and female are of similar form and colouring.

TIMALIIDÆ.

98. LEUCODIOPTRON SINENSE, L.

L. canorum, L., of my previous lists; Ibis, 1861, p. 38.

The Chinese Song-thrush, or Hwa-mei. A common bush-bird about all the hills from Canton to Foochow. Is replaced in Formosa by a closely allied form wanting the white eyebrow. Is frequently kept in confinement by the Chinese for its fine song and pugnacious habits.

99. GARRULAX PERSPICILLATUS, Gmel.; Ibis, 1861, p. 38.

A resident bird from Canton to Foochow.

100. POMATORHINUS STRIDULUS, Swinhoe, Ibis, 1861, p. 265.

Only as yet procured from the hills near Foochow.

TURDIDÆ.

101. OREOCINCLA AUREA, Hollandre.

Turdus whitei, auct. Brit.

Two seen at Amoy in March 1859; a male procured. Feathers

of a specimen were found in a wood near Pekin (see The Ibis, 1861, p. 333). I extract my note on the bird procured:—Length 11½ in.; wing 5$\frac{2}{10}$; tail 4¼; bill 1, to gape 1$\frac{4}{5}$; tarsi 1$\frac{4}{10}$; mid toe 1$\frac{3}{10}$; hind toe 1; side toes equal. The second primary is ¼ inch longer than the fifth, whereas Bonaparte, in his 'Conspectus Avium,' says that in the true *O. aurea* they are equal. Bill pale brown; legs and claws pale brownish; irides deep hazel; feathers of the rump spinous, as in the Cuckoos, *Geocichlæ*, *Campephagæ*, and *Pericrocoti*; testes dark purple; stomach somewhat oval, compressed, rather muscular, and about $\frac{9}{10}$ in widest diameter; intestine 17 inches long, from $\frac{2}{10}$ to $\frac{3}{10}$ wide; cæca ¼ long, one slightly higher than the other, and placed 1½ inch distant from anus. Whether this be a distinct race from the Siberian and rare British visitant I am not prepared to say; I have but one specimen of our bird. It was an extremely rare visitant to Amoy, and, as far I could ascertain, only in spring, when the banyan-berries were ripe. I presume it came from the wooded mountain-ranges of the interior. Formosa yields a race which is larger and paler than the Amoy bird, with sensibly longer wings and tail. For this I have proposed the specific name *O. hancii* (see The Ibis, 1863, p. 275). The Japanese race, which is declared to have been shot in Britain, as well as the true *O. aurea*, is by some considered a good species, and has been named *O. heinei*.

102. TURDUS SIBIRICUS, Gm.

T. leucocillus, Pall.

A male in complete plumage shot at Amoy, 19th April, 1861, was of a smoky black, with a pure white eyebrow, white on the axillaries, a white bar across under wing, and drops of white on the medial belly-line and crissum. Bill black; inside of mouth orange-ochre; edge of rictus pale dusky yellow; legs and claws ochre, with saffron base to tarsi and soles of toes.

This is said to be a common bird in Siberia. In Japan it probably breeds, as Captain Blakiston brought young birds from Hakodadi. In the south of China it is rare, occurring occasionally during its migrations. It is said to have been procured as far south as Java, but is not noticed by von Schrenck from Amoorland. The females are brown and Thrush-like; and the young plumage closely assimilates the species to *Oreocincla*, which group it also approaches in the somewhat spinous rigidity of the feathers of its rump, and in the white bar across its wing. In addition to these two last characters, in the smoke-grey hue of its mature plumage it appears to show a decided tendency towards the Campephagine group *Volvocivora*, which in the immature state has the white bar across the wing, allying it to the usually red-tinted *Pericrocoti*, one of which (the *P. cinereus*, Lafresn.) has, like it, a sober grey plumage and a constant *white* under-wing bar. The *Campephagæ*, as most naturalists are aware, also enjoy the peculiarity of having spinous rump-feathers, which prick the hand when passed upwards over the rump. All true *Geocichlæ* have this curious spinous character, as also the white bar across the under wing.

103. TURDUS CARDIS, Temm. Pl. Col. 518.

This Thrush hails from Japan. It is noted from the Amoor by von Schrenck. It is found in flocks every winter on the south coast of China, as far as Canton. I do not know whether the young males on leaving the nest resemble the female; but when they reach Amoy, they differ in being duskier, with larger spots, and with scarcely any rufous except on the axillaries. The plumage continues to change gradually, the olive-green upper parts at first becoming smoke-grey, and the spots on the breast disappearing, until the entire bird is black, except on the belly and vent, which remain white. I have a series of five males showing the gradual transition. Like all Thrushes, *T. cardis* varies much in size. The female retains her immature or *Turdine* dress. I have four females of different ages. The older birds are more richly coloured, with larger spots, and more rufous on the under parts.

104. TURDUS HORTULORUM, Sclater, Ibis, 1863, p. 196.

Found as a resident species in South China, about Canton and Macao. Mr. Blyth once procured a similar bird at Calcutta (which he named *Geocichla dissimilis*), but I have reason to believe it is not the same as the South-China species; neither surely can it be *T. cardis*, with which Jerdon, in his 'Birds of India,' has confounded it. Mr. Sclater has drawn the character of the species from the oldest male I possessed, but it is not quite matured. It strikes me that the adult will have the whole throat and breast cinereous, instead of only a pectoral band of that colour.

105. TURDUS CHRYSOLAUS, Temm. Pl. Col. 537.

Summers in the Amoor and Japan. Visits the south of China during winter in flocks, extending its migrations easterly to Formosa and Manilla.

106. TURDUS DAULIAS, Temm. Pl. Col. 515.

T. pallidus, Gm. ex Lath.

Common during winter in South China and Formosa. Spends the summer in Amoorland and Japan.

107. TURDUS PALLENS, Pall.

T. obscurus, Gmel.

Found in Japan and the Amoorland; migrates southwards during the winter.

108. TURDUS FUSCATUS, Pall.

Found during winter in South China; noted from Amoorland.

109. TURDUS NAUMANNI, Temm.; Ibis, 1862, p. 319, pl. x.

Found in the Amoorland; and specimens have been received from China as far down as Shanghai. On the more southern coast it is occasionally, though rarely, met with during winter.

110. TURDUS RUFICOLLIS, Pall.

This Fieldfare I found in flocks about Pekin in the commencement of the cold season (see The Ibis, 1861, p. 332, and 1863, p. 93). I have never met with it in Southern China, and it is not noted from either Japan or the Amoor.

111. TURDUS (MERULA) MANDARINUS, Bp. Consp. Av. p. 275.

Both sexes of this Blackbird have lemon-coloured bills, that of the female being tipped with black. The female is usually browner than the male; but the male himself is a dull brownish black, and sometimes the two are uncommonly hard to distinguish, especially before the immature bill has changed to yellow. This is a common resident species throughout Southern China, from Canton to Shanghai. I did not meet with it in Pekin, nor has it been noted from the Amoor. It builds a nest like that of the common Blackbird, but its eggs more resemble those of the Missel Thrush (*T. viscivorus*).

112. PETROCINCLA MANILENSIS, Bodd.

P. pandoo, Sykes.
P. affinis, Blyth.

The Rock-Thrush of Formosa and of all the exposed islands has, as far as I have ascertained, invariably a red belly in the adult male, and answers to the *P. manilensis* of authors. It is found on the Chinese coast, from Canton to Tientsin. But on the Chinese main, some distance inland, the bird is blue, and undistinguishable from *P. pandoo*, Sykes. Nearer the coast we have the intermediate race, *P. affinis* of Blyth, with partly red under parts and somewhat more graduated tail. From Amoy I have procured all three forms, and every intermediate gradation. The females of all three are, to my eyes, identical. Now the only way I can account for these three so-called species inhabiting the same locality is, that, being near the sea, the island constantly receives fresh individuals from the channel islands, which interbreeding with the blue race, *P. pandoo*, produce the third, *P. affinis*, and the intermediate forms. In song, habits, and nesting the two extreme forms observed at Amoy and in Formosa are not to be separated; and their females are so alike that it strikes me that, to solve the difficulty, we must believe the two of one common parentage, sequestrated by circumstances, and, owing to climatal or other causes, to have undergone an amount of change in their internal economy sufficient to alter the colour of their under plumage, but that this change has not so far alienated the two races as to prevent them interbreeding freely, and producing fertile offspring, in places where they are thrown together. In my large series the skins vary a good deal in size, proportions of bill, wings, tail, and legs. *P. pandoo* is generally separated from the *P. cyanea*, but I do not see on what sufficient grounds. Mr. Jerdon, in his 'Birds of India,' has rightly enough connected them. It is easy to account for *P. affinis* occurring in Burmah; for we know that the red-bellied *P.*

manilensis occurs on the coasts of Java and Siam, and, I suspect, would be found on the Andamans and on the coast of Burmah itself, where they would meet with the blue race from the interior, and cross, as I know them to do in China; *P. affinis* would then be produced. In Amoy the red-bellied race, the blue race, and the *affinis* are found in about the proportion 4 : 2 : 1. This fact of red-bellied and pale-bellied birds crossing and producing apparently fertile hybrids appears to be repeated in the small Cuckoos *Polyphasia* (see Jerdon, Birds of India, i. p. 335).

113. Orœcetes gularis, Swinhoe, Ibis, 1863, p. 93, pl. iii., and 1861, p. 332.

This forest-thrush has its nearest ally in *O. cinclorhynchus*, Vigors. It has as yet only been procured from the neighbourhood of Pekin.

114. Oriolus chinensis, L.

O. cochinchinensis, Briss.
O. indicus, Briss.

This is a summer visitant to the whole of China, and ranges as far north as the Amoor, and eastwards to Formosa. Our birds wend southwards in the winter. I have a specimen received from Siam, kindly sent me by Sir R. Schomburgk, and others from Malacca and Burmah in different stages of plumage, all identical with our summer visitant. These Malayan countries are therefore doubtless the winter resort of our bird; and I think it will be found that few, if any, of this species spend the warm season in those regions, their place being there supplied by an allied race, the *O. tenuirostris*, which we do not get. The male Oriole carries a partially immature plumage throughout the second year, the females to the third or fourth year; but in fully adult dress the sexes are not to be distinguished. It is, however, much rarer to see mature females than males. This similarity of adult sexes holds good in the allied *Psaropholus* group, and, as I am told by reliable observers, in all the Orioles.

Campephagidæ.

115. Volvocivora melaschistos, Hodgs.

Campephaga ——?, Ibis, 1861, p. 42.
C. avensis, Blyth.
C. silens, Tickell.
C. culminatus, A. Hay?

I have five of this species from China, two from Burmah, and one from Calcutta, of which the mature birds are identical in all respects, except in the size and proportions of the bill. If we regard this as a character in this bird, we should have to separate the adult specimen I procured at Canton from an adult from Amoy, the former having a very much shorter bill than the latter. But on comparison of specimens, the bill varies in each individual, and is therefore in-

sufficient as a character. *V. fimbriata*, as Jerdon remarks, does appear smaller; but all skins that I have seen from the Malacca collectors are shrunk in size, owing to their mode of preservation. Like the *Graucalus macei*, which I fully expect to meet with some day in China, this bird has a wide range over the greater part of tropical Asia. In South China, from Canton to Amoy, it is only a summer visitant, spending the season of nidification with us, and returning southwards again in the autumn. I have a nice series of the different stages of plumage it undergoes. I have a bird of the year, collected by Captain Blakiston in Canton, which is of a blackish grey, each feather carrying a bar of black and a broad cream tip; the quills and tail are greyish brown glossed with green, the former edged and tipped with cream-colour, and the latter broadly tipped with white; the under tail-coverts are cream-buff, irregularly barred with light black; many of the quill-feathers are edged inwardly with white, forming an indistinct under-wing bar. In this stage the bird appears to form a link between the young of *Oreocincla* and *Dicrurus*. As it advances to maturity, the spots disappear, the plumage becomes light smoky grey, with a wash of rusty buff and faint bars on many of the under feathers; the white on the under wing increases and forms a distinct bar. In this stage it more resembles the second plumage of *Pericrocotus cinereus*, which in the young state also has a mottled plumage, but carries a white under-wing bar through all dresses. In the adult bird the white bar disappears entirely; the wings and tail become a glossy green-black, with broad white tips to all but the two central rectrices; and the rest of the plumage deepens into a bluish smoke-grey, much paler on the under tail-coverts. The female is paler and less glossy than the male, but in other respects similar. The adult bird, when viewed seated on the bough of a tree, launching forth on wing after an insect and returning to its post, brings forcibly to mind the habits of the *Dicruri*. But at other times it may be seen hanging about the ends of branches, searching the leaves, and taking short flits into the air. On these latter occasions the younger birds, especially with their white wing-bars, might be easily mistaken for large grey *Pericrocoti* with stunted tails.

116. PERICROCOTUS CINEREUS, Lafr.; Swinh. Ibis, 1861, p. 42.

Found in summer throughout China as far north as the Amoor. Procured originally from the Philippines, to which it probably wanders in the winter. In autumn and spring, flocks are frequently met with about Canton, Amoy, and Formosa. Its plumage is black, grey, and white, with an occasional tinge of saffron on the flanks and under-wing bar. Curiously enough, this yellow tinge is brighter on the younger birds and females than on the males. The male is distinguished from the female by its broad white forehead, by its black occiput and hindneck, and by the rest of its plumage being deeper and glossier. The youngest bird I have is from Pekin, in which the under plumage is faintly barred, and the tertiaries barred with black and tipped with white. In this the under wing-coverts

and upper wing-spot are primrose-yellow. At first glance this might be taken for a Pied Wagtail. The spinous rigidity of its rump-feathers is stronger in this than in any other species with which I am acquainted.

117. PERICROCOTUS CANTONENSIS, Swinhoe, Ibis, 1861, p. 42.

This species, forming so happy a link between the preceding grey and some of the crocus-tinted forms of this group, I have as yet only seen from Canton, where it was pretty common. The tendency of the female to develope the yellow tints is in this much more strongly shown than in the last, so much so that Dr. Sclater declined to accept my identification of the sexes. But apart from any special examination of the sexual organs, the skins carry in their plumage their sexual stamp; for, analogous to what obtains in the foregoing species, the male of this has a white forehead and a dark head. I have no young specimen; but, judging from the last, I should say that the young would be as strongly tinged with saffron as the female.

♂. Bill and legs black; irides deep brown; forehead, throat, sides of nape, and vent white; the rest of the under parts dingy; head, back, and scapulars deep brown, with a wash of grey, blacker on the former; rump and upper tail-coverts light yellowish brown; wings and tail rich hair-brown, the former edged paler, the latter with the stems brownish white, and more or less white on all except the two central rectrices; white of under wing and wing-bar with a wash of pale saffron, the yellow being rather bright on some of the axillaries; wing-spot dingy yellow.

♀. Rump more of a colour with the back than in the male; upper parts lighter and browner; wing-spot bright yellow; quills edged with yellow; the light part of rectrices rather bright yellow; axillaries and wing-bar fine primrose-yellow; forehead narrow, dingy white; in other respects like the male.

Length $7\frac{2}{8}$; wing $3\frac{1}{2}$; expanse $9\frac{2}{8}$; tail $3\frac{6}{8}$.

118. PERICROCOTUS SORDIDUS, n. sp.

I have a bird, procured at Amoy on the 29th September, 1859, which differs from the preceding two in many respects, but yet has such intermediate characters that I have at one time felt inclined to consider it a variety of the one, and at other times of the other. After due deliberation, I have thought it best to separate it as a distinct form. My only specimen is a male, not quite mature. Upper parts greyish brown, paler on the forehead, and darker blue-grey on the head and hind neck; wings and tail hair-brown; greater wing-coverts tipped with white, but no wing-spot outwardly visible; two middle rectrices unicolorous, the rest more or less white; throat and vent white, the former tinged with brown; a black spot in front of the eye; under plumage greyish brown; a dingy white bar runs across the under wing, with a faint tinge of primrose-yellow. Length $7\frac{1}{2}$ in.; wing $3\frac{1}{2}$; tail $3\frac{7}{10}$. This may turn out to be only a more northern race of the *P. cantonensis*; but, at all events, it is extremely interesting as drawing the species closer still to *P. cine-*

reus. All these species have similar call-notes, and feed chiefly on tree-bugs (*Cimicidæ*) and their eggs, in search of which they creep and hang about among the leaves and branches of large trees, ranging the country in flocks.

119. PERICROCOTUS SPECIOSUS, Lath.

Phœnicornis princeps, Gould.

I have only one of this species, purchased alive from a boy who was playing with it at Foochow. I have never met with it in my rambles. Its plumage is of such a dazzling red that it quite hurts the eyes to look at it, affording a strong contrast to the sober hues of the three above.

DICRURIDÆ.

120. DICRURUS LEUCOPHÆUS, Vieill.

General plumage light bluish grey; the eye standing in a conspicuous white cheek-patch; nasal feathers, edge of outer rectrices, shafts of quills and tail, and greater part of most of primaries black; bill and legs black; irides carmine-red. This species is, strangely enough, not mentioned in Jerdon's 'Birds of India.' It has been received from the Malayan peninsula, where it is probably only a winter visitant, and is quite a distinct bird from *D. cineraceus*, Horsf., which is a Javan species. In China it is common in summer about the Vale of Foochow, and probably extends into the interior of Central China. My specimens agree precisely with a Malacca skin in Mr. Gould's collection. Captain Blakiston procured it at Canton in September, on its southward migration, and I have procured it at Amoy on its spring return, but its summer habitat does not appear to extend south of the latitude of Foochow. It will probably be found during that season to range as far north as Ningpo, though at Shanghai it is not known.

121. DICRURUS MACROCERCUS, Vieillot.

Adult deep black, glossed with blue and green. Young birds dark brown, without the gloss, and mottled on the axillaries and lower parts with white. A summer visitant throughout China right up into Amoorland. Exceedingly abundant in Formosa. I have a specimen from Hankow, Central China. Appears to be the most widely spread *Dicrurus*.

A third species of *Dicrurus* visited our garden at Amoy one spring. It was much smaller than either of the foregoing, and sang most sweetly. It stayed a few days and then disappeared. Though this was many years ago, I have never seen the form since.

122. CHIBIA HOTTENTOTTA, L.

I have a pair shot at Amoy in the spring of 1861, and I have seen another from Tientsin (North China). We must suppose, then, that this species is a summer visitant to China, and at that season sparsely scattered throughout that land. Ours is identical with the Indian bird. The female is dingier than the male, and not so well marked.

Both carry the peculiar long bristles that, springing from the root of the bill, pass over the crown down to the back and shoulders.

123. LANIUS SCHACH (Gm.).

L. chinensis, Gray.

This Shrike throws off its young plumage at the first moult, when the male and female are similar in dress. The young is light chestnut-brown on the upper parts, mottled and barred with black; throat white, rest of lower parts pale chestnut, mottled on the breast; wings deep brown, the coverts being tipped and the tertiaries edged and tipped with chestnut-red. The black eye-mark is strongly marked, but lighter than in the adult. Of the variability of this species, and the tendency it frequently shows towards allied forms, I have before remarked in my paper on the birds of Formosa, in The Ibis, 1863, p. 270. The small race from India and Borneo is distinguished as *L. erythronotus*, Vigors; and *L. nigriceps* and *L. tephronotus*, both from India, are forms closely akin to ours.

124. LANIUS PHŒNICURUS, Pall.

L. lucionensis, L.
L. superciliosus, L.
L. cristatus, L.

The first of these is found in China as a summer visitant, extending to Talien (North China) and perhaps to the Amoor. In autumn large numbers pass southwards down the coast, some making for the Philippines, touching on their way at south-west Formosa. How far south of China these migrants go we do not know; but at Malacca we have another race, distinguished by its bright rufous instead of ashy head and back. In Java, the Andamans, and Ceylon, our bird again makes its appearance, but whether as a resident or a migrant history telleth not. In Hindostan the *L. cristatus* occurs in winter chiefly, being of a browner plumage, with indistinct eye-mark; this will probably be the typical *L. phœnicurus* of Pallas, finding its summer resort in Siberia. Now, can we suppose that the large numbers of these small Butchers that leave China find their way down to the southern islands, passing over the habitat of an allied race, and after spending a few months speed back the same long distance to their summer quarters? Pondering over the laws of migration, I was much puzzled in procuring at Amoy a specimen of *L. superciliosus* (the Malacca race), and shortly after a pair of the Indian form. But when I collected a large series I found the gradation from one to the other most complete. Is it possible that in their migrations they occasionally induce others of allied forms to return with them and interbreed? I cannot help thinking it far more probable that the browner Siberian bird is the typical race, from which the others have sprung, and that the rufous colouring of the ashy *L. lucionensis*, making it in some cases almost identical with Indian birds, shows merely a natural tendency to return to the typical plumage. The characters of both these forms strongly com-

bined serve to produce the Malacca race. But, at any rate, some other agent than that of climatal influence must have been at hand to work the change, in alienating forms from their pristine type and in assimilating the aliens situated under apparently such different circumstances.

I have a fourth well-marked variety, with the ashy head, but with no white on the forehead, and scarcely any eyebrow; its back is rufous-brown, like the tail. This may yet turn out to be another race peculiar to some particular area.

On its arrival in spring and autumn at Amoy, this Shrike announces itself very soon by its loud jarring note. It feeds occasionally on insects, but I think more frequently on small birds. It arrives with the majority of the Willow-Wrens, following closely at their heels and preying daily upon them. While feeding it impales its prey on thorns, as do most Shrikes. If a bird, it usually suspends it by the neck, and commences operations on the brains. It sometimes, during its visit, entertains us with a song, which is the most melodious of its kind that I have ever heard.

125. Lanius bucephalus, Schleg. Faun. Japon.

I have one female, procured so far south as Amoy. It is found in Japan and North China.

126. Artamus fuscus, Vieill.

Reported by Cassin to have been procured by Commodore Perry's expedition at Macao. I have never met the bird. (See Report, &c., of Perry's Japanese Expedition.)

Hirundinidæ.

127. Hirundo gutturalis, Scop.

H. rustica, var. *rufa*, von Schrenck.

A summer bird throughout China as far as the Amoor. Also visits in the same season Japan and Formosa. Winters in Siam and Hindostan. Is the eastern representative of *H. rustica*, L.

128. Hirundo daurica, L.

H. alpestris, Pall.

Locally distributed throughout China as far as Peking. In North China only a summer visitant. In South China vagrant during winter. Represented in Japan and Formosa by larger varieties.

129. Chelidon lagopoda, Pall.

Never procured in China, except at Tientsin. It thence ranges into Amoorland. For comparison of this eastern race with the European *C. urbica* and with *C. blakistoni* of Japan see The Ibis, 1863, p. 91.

130. Cotyle riparia, L.

Procured in North China (Tientsin), where it is a summer visitant. It is noted by von Schrenck from Amoorland.

131. COTYLE SINENSIS, J. E. Gray.

Distinguished from the foregoing by its much shorter tail. Represents the form in South China and Formosa, repairing thither in summer to breed. It visits the plains of Hindostan in winter, and is said to breed there again in that season. Mr. Tristram tells me that he found the *C. riparia* breeding in Egypt in winter; and as they all disappear from that country in summer, it is not improbable that it is the same bird that visits Europe, and breeds a second time on arrival at its summer quarters.

MUSCICAPIDÆ.

132. HEMICHELIDON SIBIRICA, Gmel.

Muscicapa fuscedula, Pall.
H. fuliginosa, Hodgson.

I have only one of this very interesting species procured at Amoy. Ours is rather larger and has longer wings than the Himalayan bird, but I think is the same. It is said to range to the Amoor, and beyond to Kamtschatka. Its axillaries, under wings, and tips to greater wing-coverts are strongly rufescent, and approximate it to the following, from which it may be considered subgenerically to differ in the shape of the wing, though the several members of this group, as I have enumerated them, connect this in regular gradation with the typical *Butalis grisola*.

133. BUTALIS FERRUGINEA, Hodgs.

Butalis rufescens, Jerdon.
Hemichelidon rufilata, Swinhoe, Ibis, 1860, p. 57.

This is a summer visitant to South China. It is not very common; but every spring a few make their appearance at Canton and Amoy. It is identical with the Indian bird.

134. BUTALIS LATIROSTRIS, Raffles.

Muscicapa pondiceriana (Licht.), Midd. Sib. Reis.
M. cinereo-alba, Schleg. Faun. Japon.

Is a winter visitant to South China, from North China, the Amoorland, and Japan. It is identical with the Indian species, which is there a winter visitant, probably from Siberia, whence it is recorded as a summer bird.

135. BUTALIS GRISEISTICTA, Swinhoe, Ibis, 1861, p. 330.

Muscicapa grisola, var. *daurica*, Pall.

This links the small half-Swallow group of Fly-catchers with the spotted *Butalis*, and might with propriety be placed in either genus. It is a summer visitant to China, at which season I have found it as far north as Peking.

136. XANTHOPYGIA LEUCOPHRYS, Blyth, Journ. As. Soc. xvi. p. 123.

The male of this may at once be distinguished from that of the following species by its white eyebrow, which, in the other, is bright golden, by its less flammeous tints, and by its smaller size and more slender form. The female is widely different from the female of the other, if my specimen from Tientsin be correctly marked; but I suspect it is an immature male. This bird extends its summer migration as far north as Tientsin. I procured a male once at Amoy. It was originally described from the peninsula of Malacca, where I suspect it hybernates. Its migrations must be performed well inland, or we should see more of it on the coast.

137. XANTHOPYGIA NARCISSINA.

Muscicapa narcissina, Temm. & Schleg. Faun. Japon. (the male).
Muscicapa hylocharis, Temm. & Schleg. Faun. Japon. (the female).

Occurs at Amoy and Canton in large numbers in spring and autumn, bound apparently to Japan, where they are found in summer. The male and female are by mistake distinguished in the 'Fauna Japonica' as two distinct species. I found this to be the case on looking over the plates, and proved my suspicions to be correct by an examination of the birds in the Leyden Museum.

138. TCHITREA PRINCIPALIS.

Muscicapa principalis, Schleg. Faun. Jap.

Passes Canton and Amoy, on its way to and from Japan. Is found during winter in the Malacca peninsula, where it is noted as *T. atricaudata*, A. Hay. Varies a good deal in size and length of wings and tail.

139. TCHITREA INCEI, Gould, Birds of Asia.

Allied to *T. affinis*, from which distinguished by its smaller bill, by its green-black head and neck, and by the purpler tints of its upper parts. Combines to a certain degree the characters of *T. affinis* and *T. paradisi* with those of *T. principalis*. Mr. Whiteley of Woolwich procured several, through Mr. Fleming, from Tientsin, and one in the white plumage. Is a summer visitant to North China, from Shanghai to Tientsin. Mr. Gould's type specimen was from the former locality.

140. MYIAGRA AZUREA, Bodd.

Common in Formosa. A rare winter straggler to Amoy. Occurs in various parts of India and Malayana (see Jerdon's Birds of India). Is said also to occur in the Philippines.

141. EUMYIAS MELANOPS, Vigors.

Stoparola melanops of my Amoy list.

Of the distribution of this bird in China I know nothing. I

never procured but one female, and that was at Amoy, in December 1857.

142. CYANOPTILA CYANOMELÆNA (Temm.), Pl. Col. 470 (the male).

Muscicapa gularis, Temm. Faun. Jap. (the female).

In spring and autumn these birds are very abundant about Canton and Amoy, on their way to and from North China and Japan. I do not think many, if any, stay in the south. I have seen specimens from Tientsin; and von Schrenck notes the female *M. gularis* from the Amoor. I have one specimen with very short bill; but specimens differ in the size of that organ, and in the tint of the blue on the crown. For a further account of this species, see The Ibis, 1861, p. 41.

143. ERYTHROSTERNA LEUCURA (Gm.).

Muscicapa albicilla, Pallas.

The eastern representative of *E. parva*, Bechst. It is common in North China, and is found as far north as the Amoor. In winter it migrates southwards, at which season we meet with it in Amoy and Canton. It differs from *E. parva* in having only a red patch on the throat, which does not extend down the breast. Both *E. parva* and *E. leucura* occur, I am told, in Hindostan during winter.

144. ERYTHROSTERNA LUTEOLA.

Muscicapa luteola (Pall.), Midd. Sib. Reis. pl. 17. f. 1–3.
M. mugimaki, Schleg. Faun. Jap.
M. erythaca, Blyth.
Muscicapa hylocharis, Swinhoe, Ibis, 1862, p. 305 (nec Schleg.).

The male of this species is figured in the 'Fauna Japonica' as *M. mugimaki*, and I myself have long confounded it with the preceding bird. The female, with its Robin-like plumage, and absence of white on the lateral rectrices, is the *M. erythaca* of Blyth, from Penang. I procured a female at Amoy in November 1861, and unfortunately made the already existing confusion worse by describing it in The Ibis as *Muscicapa hylocharis* of the 'Fauna Japonica.' Von Schrenck figures a young bird from the Amoor in mottled plumage, with the white base to tail. It is rather curious, then, that our female should have no signs of it. This bird would appear to extend over the north of Eastern Asia and Japan, repairing southwards in winter.

SYLVIIDÆ.

145. IANTHIA CYANURA.

Iusciola cyanura, Faun. Jap.
Ianthia et *Nemura rufilata* of my former lists.

Male blue on upper parts, white-eyebrowed; white on hinder parts, with orange-coloured sides; distinguished from the Himalayan

race, *I. rufilata*, Hodgson, by the white eyebrow, which in the other is wanting. Female greenish olive on upper parts, olive-buff on lower, with orange sides, blue tail-coverts, and blue-washed tail. Summers in North China, the Amoor, and Japan, and visits Amoy and South China in winter.

146. RUTICILLA FULIGINOSA, Vigors.

Inhabits high hill-ranges of South China, and is found in the plains during winter. Is identical with the Himalayan bird. Occurs also in Formosa.

147. RUTICILLA AUROREA, Pall.

Ruticilla leucoptera, Blyth.

Summer visitant to North China, the Amoor, and Japan; found in Amoy and South China in winter. Easily recognized by its conspicuous white wing-spot.

148. PRATINCOLA FERREA, Hodg.

Intermediate between the Chats and the Redstarts. Roams about in parties in South China during winter. Probably retires to the mountains of the interior to breed. Specimens from the Himalayas and Tenasserim are identical with ours.

149. PRATINCOLA RUBICOLA, var. INDICA, Blyth.

This is nothing more than an eastern race of *P. rubicola* of Europe, chiefly distinguished by its black, instead of white, axillaries in the adult male. My specimens vary a good deal in size and length of wing. During winter it is abundant in the South of China, but in spring betakes itself north, and in summer is found in North China, the Amoor, and Japan.

150. CYANECULA CÆRULECULA, Pall.

This is the red-spot Bluethroat. I have never seen it in China, except from the neighbourhood of Tientsin, where it would appear to be a rare summer straggler. It is not noticed from the Amoor or Japan.

151. COPSYCHUS SAULARIS, L.

The common resident Magpie-robin of South China up to Foochow. It does not extend so far north as Shanghai. Our bird is identical with the species prevalent in Hindostan.

152. LARVIVORA GRACILIS, Swinhoe, Ibis, 1861, p. 262, et P.Z.S. 1862, p. 316.

Male cyaneous on the upper parts, with black face and cheek, pure white on under parts. Female greenish olive on the upper parts, white on the lower, with buff markings on the face and sides. Young birds like the female, but with the throat and breast buff. Allied to *L. cyanea*, Hodgs., of the Himalayas.

These birds are locally distributed throughout China, from Canton to Pekin. They roam about during winter, but I believe do not

regularly migrate. I found them not uncommon about Canton. I have procured them at various seasons at Amoy, and have seen them from Tientsin.

153. LARVIVORA SIBILANS, n. sp.

Larvivora, sp. ?, Swinhoe, Ibis, 1861, p. 34.

My only specimen from Macao of this bird is a very wretched one. It may be that of a female, but I have reason to believe it an adult bird; for I watched several, and they all appeared of similar plumage. It is of a sober olive-brown, with the red tail of a Redstart, the feet of *Larvivora*, and the bill of a Robin. It was not at all uncommon about the copses and thickets near Macao in May, but extremely difficult to get at. I trust I may make the bird's better acquaintance on some future day. I have thought it worth while now to allude to it, as I consider it a good species.

154. CALLIOPE KAMTSCHATKENSIS, Gm.

Male with fine crimson throat. Females with throat whitish, and without the white and black that ornaments the face of the male. When passing our coast in spring, the young males are found returning without having acquired the adult tints, usually only a few reddish feathers appearing on the throat; but the change of hue (not moult) goes on very rapidly, and probably would be perfected by the time of their arrival at their northern destination. The young males can be readily distinguished from the females by their much whiter throats and darker lores. These birds touch at Amoy in their northward migrations in April; I would hence infer that they had been a long way south for their winter. Their summer range is all through North China, Mantchuria, as far as Kamtschatka. I found them at Pekin in October; but they were young birds, and might have been late in their southward migrations. They occur abundantly, I am told, during winter in Hindostan. These would be birds from the Siberian region. Our northern migrants would be expected to winter in Siam and the Malayan peninsula, whence, I believe, specimens have been received. In form these birds are intermediate between the Robins and the Reed-warblers.

155. TRIBURA SQUAMEICEPS, n. sp.

Allied to *Tribura luteiventris*, Hodgs., from Nepal. I have only one specimen, procured by Captain Blakiston at Canton. Upper parts rich brown, with a tint of chestnut and olive, the former strongest on the head and wings. A well-defined cream-coloured eyebrow runs over the eye. The feathers of the head edged darker, giving the appearance of scales; under parts white, with an occasional tinge of buff; axillaries and flanks olive-brown; wing 2·1, short and rounded, the fourth quill being the longest, the third and fifth $\frac{1}{12}$th shorter, and nearly equal. The specimen is unfortunately tailless, and I therefore cannot give a very detailed description of it.

156. LOCUSTELLA HENDERSONII, Cassin, Proc. Phil. Acad. Sciences, 1858, p. 194.

L. macropus, Swinhoe, P. Z. S. 1863, p. 93.

Allied to *Sylvia locustella*, L., of Europe, but with conspicuously larger feet. I have only procured it in South China in summer. If ours is the same as that spoken of by von Schrenck as occurring in Amoorland in May, the summer resort of our bird will be of vast extent, and it will probably be the same species found in Siberia, and reported visiting the plains of Hindostan in winter. The bird from Hakodadi (Japan), described by Cassin, would appear to be identical with the *Locustella* from Amoorland and this species.

157. LOCUSTELLA MINUTA, Swinhoe, P. Z. S. 1863, p. 93.

A diminutive species resident in South China, procured at Amoy and Canton.

158. LOCUSTELLA OCHOTENSIS, Middendorff, Sib. Reis.

With stronger legs and feet than most species of this genus. Von Schrenck considers it the same as *L. certhiola*, Pall.; but that is a larger and distinct bird, with apparently a more western range through Siberia. This is a summer visitant to North China, the Amoor, and Japan. In South China it has occurred only in winter.

159. CALAMODYTA SORGHOPHILA, Swinhoe, P.Z.S. 1863, p. 92.

The eastern representative of *C. phragmitis* of Europe. I procured one specimen on the 20th of May at Amoy. It would appear to be a summer visitant to the South of China. No Sedgewarbler is noted from the Amoor.

160. CALAMOHERPE BISTRIGICEPS, Swinhoe, Ibis, 1860, p. 51.

Calamodyta maackii, von Schrenck, Amurland.

I first procured this bird on the 25th of October 1856, and described it in The Ibis for January 1860. The same species appears to have been brought from Amoorland by M. Maack, and styled by von Schrenck *maackii*, after its discoverer, also in 1860, but subsequently to the publication of my name, which will hence have to be adopted. I have three specimens, all from the neighbourhood of Amoy. It is in South China a winter bird, returning to the north in summer.

161. CALAMOHERPE ORIENTALIS, Bp.

Salicaria turdina orientalis, Temm. & Schleg. Faun. Jap.
Acrocephalus magnirostris, Swinhoe, Ibis, ii. p. 51.

Ranges in China, from Canton to Shanghai, as a summer bird. In the extreme south a few stay all the year. Found in summer also in Formosa and Japan. Is the eastern representative of the European *C. turdoides*.

162. CALAMOHERPE FUMIGATA, Swinhoe, P. Z. S. 1863, p. 91.

Lusciola caligata, Licht. (*Motacilla salicaria*, Pall.)?

A summer visitant to South China. Abundant on the Island of Amoy for a few days in the middle of May.

163. CALAMOHERPE AËDON.

Turdus aëdon, Pallas.
Arundinax olivaceus, Blyth.

I have a specimen from the Andamans presented to me by Mr. Blyth, and another from Tientsin, both precisely identical. It is figured by von Schrenck from the Amoor. I have not yet met with it in South China. It summers in Siberia, North China, and Amoorland, and winters in Hindostan, probably extending during that season along the Malayan peninsula and into the Andamans.

164. CALAMOHERPE CANTILLANS.

Salicaria cantillans, Temm. & Schleg. Faun. Jap.

One specimen procured by Mr. Fleming at Tientsin. It would appear to replace in North China and Japan the following species of the south.

165. CALAMOHERPE MINUTA.

Arundinax minutus, Swinhoe, Ibis, 1860, p. 52.

This bird arrives from the south to spend the summer in South China. A few, however, occur all the year. It is a curious diminutive of the following, though entirely distinct in manners and song.

166. CALAMOHERPE CANTURIANS.

Arundinax canturians, Swinhoe, Ibis, 1860, p. 52.

Abundant from Canton to Shanghai, and in Formosa. A southwardly migration takes place in winter, but numbers stay all through the year. As the *C. cantillans* replaces the *C. minuta* north of Shanghai, so I suspect the *C. cantans* of Japan replaces this species in that region.

167. DRYMŒCA EXTENSICAUDA, Swinhoe, Ibis, 1860, p. 50.

Female smaller than male, with shorter tail. Winter plumage more strongly tinted with buff than summer. Bill in winter light-coloured, in summer black. For notes on the habits of this bird, see my different lists in The Ibis. Found as a constant resident in South China, from Amoy to Foochow; also in Formosa.

168. PRINIA SONITANS, Swinhoe, Ibis, 1860, p. 50.

A resident in South China, from Canton to Foochow; also in Formosa.

169. ORTHOTOMUS PHYLLORRHAPHEUS, Swinhoe, Ibis, 1860, p. 49.

An abundant resident in South China, from Canton to Foochow. The male acquires long central tail-feathers in spring.

170. CISTICOLA SCHŒNICOLA, Bp.

C. cursitans, Franklin.
C. brunneicephala, Temm. & Schleg. Faun. Jap.
C. tintinnabulans, Swinhoe.

Common at Shanghai in summer, extending its range to Pekin. The majority from the north wend southwards, and pass the winter in South China, at which season only I have found it near Amoy. In south-west Formosa it is resident. It has also been noted from Japan, but not from the Amoor. I have, in company with Mr. Tristram, compared Chinese, Formosan, and Indian examples with European specimens, and can note no tangible differences.

171. PHYLLOPNEUSTE FUSCATA.

Phylloscopus fuscatus, Blyth, J. A. S. xi. p. 113; xii. p. 965.
Phyllopneuste sibirica, Middendorff, Sib. Reise, ii. tab. 16.

Summers in Siberia, North China, and Amoorland, and winters in South China and the plains of Hindostan. A few, I suspect, stay all the year in South China. It varies much in size and length of wing. I have one very large specimen from Amoy, evidently only an individual variety.

172. PHYLLOPNEUSTE TENELLIPES.

Phylloscopus tenellipes, Swinhoe, Ibis, 1860, p. 53.

Found about Amoy and South China during winter; probably winters in North China, but has not yet been noted thence, nor yet from the Amoor. I have three specimens from Amoy. Length 4·4; wing 2·3; tail 1·9. Bill brown, paler at edges, tip, and base of gonys; inside of mouth light yellow. Legs and claws pale flesh-colour. This is one of the most distinct species of this group, and in colouring holds a place between the foregoing brown bird and the greener forms.

173. PHYLLOPNEUSTE SYLVICULTRIX.

Phylloscopus sylvicultrix, Swinhoe, Ibis, 1860, p. 53.
P. javanica (Horsf.), Blasius, Ibis, 1862, p. 69?

I have nearly 200 examples of this species from Amoy, which differ in general size, in the length and bulk of the bill, in the length of the wings and of the first primary, and in the tints of the tarse. Were two of the extreme forms taken separately, some naturalists would be inclined to set them down as distinct species; but with my large series of every intermediate grade and form before one, the special points of distinction disappear, and one cannot help avowing them all to be the same. In this view Mr. Tristram, who has kindly examined them with me, entirely concurs. All the Chinese forms of *Phyllopneuste*, with the exception of the *P. fuscata*, show more or less yellowish spots on the wing—a distinction which does not appear to be shared by any of the European forms. In this character the wings of our birds show some affinity to the well-banded wing of the *Reguloides* group, to which they further approximate in the shape of their tails.

P. sylvicultrix visits Amoy in large numbers during its autumnal and vernal migrations. It probably summers in the interior of China and about Ningpo and Shanghai. I have procured it in autumn in south-west Formosa, and I have reason to believe it winters in the Philippines. Its great destroyer is the *Lanius lucionensis*, Strickl., which migrates about the same time, passing Amoy in immense numbers, and crossing over to the Philippines *viâ* south-west Formosa. Professor Schlegel showed me some Willow-wrens, I think from Halmahein, which seemed identical with Chinese examples of this bird. These would doubtless be the same that Professor Blasius refers to as *P. javanica*, Horsf. (see Ibis, 1862, p. 69). The type specimen of Horsfield's *Sylvia javanica* in the East India Museum is, however, a *Zosterops*, as demonstrated by Mr. Blyth and others years ago. It is not at all improbable that our *P. sylvicultrix* spreads in winter throughout the Malayan Islands. The various Chinese species of *Phyllopneuste*, with the exception of *P. fuscata*, Mr. Blyth and I have ascertained by actual comparison to be quite distinct from those found in India.

174. PHYLLOPNEUSTE XANTHODRYAS, n. sp.

♂, shot at Amoy on the 23rd of April 1861. Length 5·5; wing 2·9; tail 2·3. First primary pointed, ·65; second ·4, shorter than the third, which is nearly of a length with the fourth and fifth. Bill blackish brown on the upper mandible; edge of ditto, tip, and lower mandible yellow-ochre, rather dingy on the latter. Inside of mouth light orange-yellow. Eyelid light black. Legs and claws pale brown, with a tinge of yellow on the feet and claws.

♀, shot on the 20th of May, at Amoy. Length 5·4; wing 2·7; tail 2·2. Bill and gape less yellow than before, the former browner. Legs light sienna-yellow, tinged with brown.

This is the largest *Phyllopneuste* I have met with in China. It approaches *P. coronata* nearest in size of bill, but has no coronal stripe, and the under parts are much yellower. From *P. sylvicultrix* it is easily recognized by its much superior size, its yellow under parts, its more robust claws, the larger size of the first primary, and the greater difference between the second and third.

The gizzard of one dissected was round, compressed on the sides, with a large circular tendon on each side. It was lined internally with a thick rugous epithelium, and contained remains of flies.

This species may, I think, be considered as a summer visitant to Central China from the south, passing Amoy *en route*.

175. PHYLLOPNEUSTE PLUMBEITARSA.

Phylloscopus plumbeitarsus, Swinhoe, Ibis, 1861, p. 330.
Phyllopneuste rufa, von Schrenck, Amurland.
P. borealis, Blasius, Ibis, 1862, p. 69?

I have only one specimen of this bird, procured near Pekin in October, which I take to be an individual migrating southwards from its summer quarters in Amoorland. From that region von Schrenck

gives *P. rufa*; and, from its approach to that species, the bird mentioned by that authority would naturally be our species. But from *P. rufa* ours is at once distinguishable by its short thicker bill, and by the yellowish tips to its lesser and greater wing-coverts. In the shape of its bill, ours has more affinity with *P. eversmanni* of Siberia, figured in Middendorff, Sib. Reis., but differs also from that in its yellowish wing-markings.

176. PHYLLOPNEUSTE CORONATA.

Ficedula coronata, Temm. & Schleg. Faun. Jap.

This is a summer visitant to North China and Japan, repairing in winter to South China, at which latter season it occurs at Amoy. *Reguloides trochiloides*, Sundevall, is a closely allied species from India, but is smaller, has a smaller bill, and brighter yellow tips to wing-coverts. It is the representative race of our species in more Western Asia, and ought perhaps, with ours, rather to be included in this genus than among the pseudo-Goldcrests.

177. REGULOIDES SUPERCILIOSUS (Gm.).

Regulus modestus, Gould.

Summers in North China and Japan, and is abundant during the cold season throughout Southern China and Formosa. It is then also said to occur in the plains of Hindostan. The bird shot by Mr. J. Hancock, of Newcastle, on the coast of Yorkshire I have lately had the privilege of examining, and find to be identical with my Chinese examples.

178. REGULOIDES PROREGULUS, Pall.

A summer visitant to North China, and a winter visitant to South China. Recognized at once from the foregoing by its yellow rump-band. I have procured this, as well as the last, near Pekin in September; and I hence infer that this also ranges into the Amoor territory, and has been confounded by von Schrenck with the above.

ZOSTEROPIDÆ.

179. ZOSTEROPS SIMPLEX, Swinhoe, P. Z. S. 1862, p. 317, et Ibis, 1863, p. 294.

This species ranges in China, from Canton to Foochow, and perhaps a little higher, but not to Shanghai, where it is replaced by the following. In Formosa it is also an abundant resident. On its nesting and habits I have already written much in The Ibis, and therefore will not here repeat my remarks. It has its nearest ally in the *Z. palpebrosa* of India, being, like it, light grey on the under parts. An occasional specimen or two, however, may be picked out of my Amoy series with a tinge of chestnut-brown on the under parts, showing the tendency of the species towards the Japanese *Z. japonica*. Some have the belly deeper grey than others. The yellow on the throat and

vent varies in intensity, as also does the green of the upper parts; but these are chiefly distinctions of sex or age. I have one pale (almost yellow) variety, procured by Captain Blakiston at Canton. All the adults have the black lore and eye-line, shown also in the following and in many of this group. I have specimens from Hongkong, Macao, Canton, Amoy, Foochow, and Formosa, and they all agree in essential characters.

180. Zosterops erythropleura, Swinhoe, P. Z. S. 1863, p. 204.

This species, which extends from Shanghai to Tientsin and the Amoor, I had confounded with the *Z. japonica* of the 'Fauna Japonica,' until lately, when, on a visit to M. Jules Verreaux at Paris, I had the pleasure of examining for the first time a Japanese specimen, and of comparing it with North China skins. The difference in the two birds is striking. The under parts of *Z. japonica* are a dull light brownish chestnut, while the flanks of this species are a deep rusty chestnut. This bird is larger and longer-winged than our South-China species, but is exceeded in both by the Japanese. I have examined two specimens from Shanghai from M. Jules Verreaux's collection, and one from Tientsin. The two former are much brighter on the flanks than the latter; but as they are both males, and our Tientsin bird is a female, the difference may be only a sexual one, and not one of locality. What could have induced von Schrenck to confuse this species with the *Z. chloronota*, Gould, of Australia, I cannot understand. The shape of the bill and head of this last, as well as the dull sordid colour of the plumage, show at once a marked difference from the Chinese bird. Indeed there are many species from Asia and Africa far more closely allied to our species than is the *Z. chloronota*. As I have never met with the North China species alive, except as a cage-bird, I have nothing special to relate regarding its habits.

Ampelidæ.

181. Liothrix lutea.

Sylvia lutea, Scopoli.
Tanagra sinensis, Gmel.
Parus furcatus, Temm.

Often seen alive in cages at Canton. Is said to be brought from the interior. I never met with it in a wild state.

182. Ampelis garrula, L.

Occasionally met with in North China during winter.

Fringillidæ.

183. Fringilla montifringilla, L.

Met with in North China during winter. Summers in Amoorland. Captain Blakiston killed one out of a small party at Shanghai in January.

184. ÆGIOTHUS LINARIUS, L.

185. ÆGIOTHUS CANESCENS, Gould.

Both these species come down into North China from Amoorland and the north during winter.

186. CHRYSOMITRIS SPINUS, L.

Comes down from the north in winter, as far south as Foochow.

187. CHLOROSPIZA SINICA, L.

Fringilla kawariba minor, Temm. & Schleg. Faun. Jap.

Common throughout China, from Canton to Pekin, at all seasons. A larger race occurs in some parts of Japan, while in others its place is said to be supplied by this bird.

188. CARPODACUS ERYTHRINUS, Pall.

Procured at Tientsin. Is said to be taken occasionally near Canton during winter.

189. COCCOTHRAUSTES MELANURUS, Gmel.

A common resident bird from Canton to Shanghai. I have not traced it further north. Is replaced in Japan by a near species, *C. personatus*.

190. COCCOTHRAUSTES VULGARIS, Ray.

Found in Amoorland, about Pekin, and at Japan. I have not discovered it in the more southerly part of China.

191. LOXIA CURVIROSTRA, L.

A winter visitant to North China. Is found in Amoorland, where *L. leucoptera* is said also to occur. Brought from Hakodadi, North Japan.

192. MUNIA ORYZIVORA, L.

Found about Canton, and occasionally near Amoy. A South-China bird, extending to the Straits of Malacca and Java.

193. MUNIA TOPELA, Swinhoe, Ibis, 1863, p. 90.

A common resident from Canton to Foochow, and in Formosa.

194. MUNIA ACUTICAUDA, Hodgs.

An abundant resident from Canton to Shanghai, and in Formosa. Is domesticated in Japan, where it also probably occurs in a wild state, though it has not been noted from there.

195. PASSER MONTANUS, L.

The common House-Sparrow throughout China, the Amoor, Formosa, and Japan.

196. PASSER RUSSATUS, Temm. & Schleg. Faun. Jap.

The Tree-Sparrow of China, Japan, and Formosa. The female

of this species presents a plumage like that of the female *P. domesticus*, L.

197. EUSPIZA RUTILA (Pall.); Bp. Consp. Av. p. 469.

Found in Siberia, Amoorland, and Japan. A few wend their way southwards in winter. I have procured it at Amoy, where it is extremely scarce.

198. EUSPIZA AUREOLA (Pall.); Bp. Consp. Av. p. 468.

Summers in North China, Amoorland, and Japan, and winters in South China, and plentifully in Burmah. Abundant about Canton and Amoy during the cool season. Known to Europeans in China as the "Canton Ortolan."

199. EUSPIZA SULPHURATA.

Emberiza sulphurata, Temm. & Schleg. Faun. Jap.

Summers in Japan, and winters in South China. Numbers touch Amoy on the northward migration in April. Has not been noted either from North China or the Amoor. In Sir William Jardine's 'Life and Memoirs of Mr. Hugh Strickland,' a bird is described and figured as *Euspiza cinerea* from Smyrna, which looks much like a larger representative race of this species.

200. MELOPHUS MELANICTERUS (Gmel.); Bp. Consp. Av. p. 470.

Abundant at all seasons about Canton, Macao, and Amoy, extending upwards to Foochow, but I do not think much further north.

201. EMBERIZA PITYORNIS (Pall.); Bp. Consp. Av. p. 466.

Siberia, North China, and the Amoor. I met with it at Pekin in October.

202. EMBERIZA SPODOCEPHALA, Pall.

E. personata, Temm.
E. melanops, Blyth.

I have a large series of this bird, all shot at Amoy, in various stages of plumage, answering to the three so-called species. The entire grey head and neck, and black round the bill, are put on by the male in full plumage; and the yellow tints of the under parts vary in hue and intensity. Von Schrenck notices the two first from Amoorland as distinct species; and Mr. Blyth has described the third as an occasional straggler in North-eastern India. In winter it visits the south of China in large numbers, returning on the approach of summer to North China, the Amoor, and Japan.

203. EMBERIZA CIOPSIS, Bp.

E. cioides, Temm. & Schleg. Faun. Jap.

This species is found in North China, Amoorland, and Japan. It is a winter visitant to South China.

204. EMBERIZA RUSTICA (Pall.); Bp. Consp. Av. p. 466.

North China, the Amoor, and Japan. Not yet met with in South China.

205. EMBERIZA FUCATA (Pall.); Bp. Consp. Av. p. 464.

Winters in South China. Found in summer in North China and Japan.

206. EMBERIZA STRACHEYI (Moore); Swinhoe, Ibis, 1863, p. 9.

Procured at Tientsin (Fleming), and at Kumaon (Strachey). Nothing is known of its movements or distribution.

207. EMBERIZA CHRYSOPHRYS (Pall.); Bp. Consp. Av. p. 464.

Siberia, and probably Western China. I procured a specimen near Pekin in September.

208. EMBERIZA CANESCENS, Swinhoe, Ibis, 1860, p. 62.

Occurs in South China in winter only; probably retires to North China to breed.

209. EMBERIZA PUSILLA (Pall.); Bp. Consp. Av. p. 464.

Abundant in North China near Pekin, some visiting South China in winter. Found also in Amoorland.

210. SCHŒNICOLA PASSERINA, var. β, Pall. Zoogr. Ross. Asiat. ii. 48, 49.

Emberiza schœniclus, var. *minor*, Midd. Sib. Reise.
E. polaris, Midd.?

Amoorland and North Japan. It is doubtless also a North-Chinese bird.

211. PLECTROPHANES NIVALIS, L.

Visits North China in the cold weather.

212. CENTROPHANES LAPPONICA, L.

Abundant near Pekin in winter.

STURNIDÆ.

213. STURNUS VULGARIS, L.

I include this bird in my Chinese list on the authority of a specimen in the British Museum, said to have been brought by Mr. Reeves from Canton. I have never met with the bird.

214. STURNUS CINERACEUS, Temm. & Schleg. Faun. Jap.

Summers in Japan and North China to the Amoor. Visits South China in large flocks during winter.

215. STURNUS SERICEUS, Gmel.

A resident species from Canton to Shanghai, extending probably

further north. In winter assembles in large flocks and ranges about the country, often associating with the foregoing.

216. HETÆRORNIS SINENSIS.

Oriolus sinensis, Gmel.
O. buffonianus, Shaw.
Pastor turdiformis, Wagl.
Sturnia cana, Blyth.

Arrives in large numbers in spring in South China, frequenting houses, and building in the holes of their roofs. It stays the summer, and then disappears. It is in that season very common from Canton to a little above Amoy, not extending so far north as Foochow. Its winter migration appears to extend into Pegu, whence identical specimens have been received. All the species of this genus become strongly tinged in the breeding-season with a rusty buff, very bright in parts. In the autumn the moult takes place, when the feathers resume their natural colour. What is the cause of this tint I cannot divine; but, to show how strong it is, Mr. Blyth named the species from the Nicobars *H. erythropygius*, from its red rump. The next specimen he procured was later in the season, and the red-tinged parts had moulted into their natural white colours. This tinge is perhaps analogous to that of the breast of *Gypaëtus barbatus*, of the Teal, and of several other birds. In our bird it is too generally diffused to suppose that it has been rubbed on extraneously. It comes doubtless from the body of the bird, and must owe its origin to some constitutional peculiarity.

217. HETÆRORNIS DAURICUS.

Sturnus dauricus, Pall.
Turdus dominicanus, Gm.
Pastor malayensis, Eyton.

Found in North China and Amoorland in summer; its southward migration would appear to extend into Hindostan, the Malayan peninsula, and Java, whence specimens have been received. It does not appear to travel down the Chinese coast to its winter destination, or we should have met with it in South China, which we never have. It probably takes an inland route through Daouria, whence Pallas obtained and described his type specimens.

This species is replaced in Japan by the little *H. pyrrhogenys*, Müll. (*Lamprotornis pyrrhopogon*, Schleg. Faun. Jap.), which is there a summer visitant only, being found during the winter in the Philippines, whence I have received skins. I naturally expected to find it touching on its travels at Formosa, but did not; nor have I ever come across it on the Chinese coast. I may here remark that a specimen of this bird sent to Mr. Blyth was described by him as a new species, under the name *Calornis albifrons*.

218. ACRIDOTHERES CRISTATELLUS, L.

Found in China as a resident species, from Canton to Shanghai.

Abundant also in Formosa. Is found also in the Philippines, whither it is said to have been conveyed originally for the destruction of locusts. The members of this genus are closely allied, but very local in their distribution. Great confusion exists in their nomenclature; but the description of Linnæus doubtless refers to the Chinese Starling so called, though he describes it as a bird from Bengal.

There is quite a peculiar species in Siam, which I have received from Sir Robert Schomburgk, H. M. Consul at Bangkok. This in coloration is a good deal similar to the Chinese bird, but has the bill a bright yellow, instead of light lemon-colour; its vent is pure white, instead of black tipped with white; its nasal crest is much smaller, and the pointed feathers on its crown much longer, than in ours; its rectrices are, moreover, much more largely tipped with white. In size and other respects the two nearly agree. For this I would now propose the name *A. siamensis*.

219. GRACUPICA NIGRICOLLIS.

Gracula nigricollis, Paykull.
Pastor bicolor, Gr.
Pastor temporalis, Wagl.
Sturnus temporalis, Blyth.
Gracula melanoleuca, Sonnerat.
Gracupica melanoleuca, Less.

A resident species in South China, from Canton to Foochow; extends in its distribution as far south as Siam. Its bare cheeks, when alive, are bright yellow, and not red as stated in Bp. Consp. Av. p. 421. The immature bird has the head and neck light brown, and its general colours are much lighter than in the adult.

CORVIDÆ.

220. PICA CAUDATA, Ray, var. *media*.

P. media, Blyth.
P. sericea, Gould.

The Magpie is an abundant resident throughout China, Amoorland, Kamtschatka, Japan, and Formosa. On specimens procured from these different regions two additional species have been created, founded on the variation of the length of wing and expansion of alar white,—*P. japonica*, Bp., and *P. media*, Blyth. My specimen from Pekin seems entirely to agree with British skins; but the majority of those from Amoy differ in the tints of the tail, and in having much less white on the quills. I have, however, from that locality one which is identical with the Pekin bird. On examining nestlings and young birds, I find that the alar white is again much less; and, on carefully comparing my large series of Amoy skins, I find great variation in length of wing, in the tints of the tail, and in the size of the white band on the rump, this last, in some, being scarcely visible. I therefore cannot help reducing the so-called species again into the original one; for, as the Magpie is not a migratory bird, one can scarcely suppose that the true Pekin race would oc-

casionally find its way down to Amoy, a distance of over 1000 miles. We might, perhaps, regard the South-China bird as a race of itself, with a frequent tendency to revert to the typical form.

The tail of *P. caudata* from Holland and England is very much bronzed, much more so than that of the Pekin bird, but in no greater degree differing than does the Pekin bird and one from Amoy from the majority of those from that locality. The tail of *P. numidica* is similarly different from that of the English bird; and, on analogy, it is therefore not improbable that the Amoor bird would more nearly approach the Dutch and English in brightness.

221. CYANOPICA CYANEA, Pall.

Pica melanocephalos, Wagl.

Abundant from Shanghai to Pekin, thence into Amoorland and Japan. A resident species. I have not been able to recognize two distinct species in these, as is done by Bonaparte in his Conspectus, p. 382.

222. UROCISSA SINENSIS, L.

A resident species on all the wooded hills from Canton to Ningpo, represented in Formosa by another species, the *U. cærulea*, Gould. The male has a much larger bill than the female, of a uniform orange-red, and not tipped, like hers, on the apical culmen with black. The young bird has a brownish-yellow bill, brown legs and irides. Crown of head pale grey; nasal feathers, cheeks, and sides of neck light black, lighter on the under neck, and nearly grey on the throat. The rest of the plumage paler and duskier than in the adult.

This species was procured by Captain Blakiston near Ichang, 1100 miles up the Yangtsze; so that its range would appear to extend throughout entire Southern China.

223. DENDROCITTA SINENSIS, Lath.

Said to inhabit the mountains of South China.

224. GARRULUS SINENSIS, Gould.

Very closely allied to *G. bispecularis*, Gould, of the Himalayas. Ranges in China from Canton to Ningpo. Further north, it is represented by another species, of which I have no specimens, but which I believe to be the *G. brandtii*, Eversm., a bird found also in Amoorland, and lately procured in Hakodadi, North Japan, by Capt. Blakiston. South Japan produces an ally of *G. glandarius*, in *G. japonicus*, Schleg., and Formosa a diminutive ally of *G. sinensis*, in *G. insularis*, Gould.

225. LYCOS DAURICUS.

Corvus dauricus (Pall.), Faun. Japon. t. 41.

Abundant about Pekin, thence ranging north into Amoorland, and west into Siberia. I have not traced it further south into China, It also occurs in Japan.

226. Lycos neglectus.

Corvus (*Monedula*) *neglectus*, Temm. & Schleg. Faun. Japon.

This has the same range as the above, and is much more closely allied to the true *L. monedula*. I have unfortunately no specimens.

227. Corvus torquatus, Less.

C. pectoralis, Gould.

A resident species in China, from Canton to Pekin. The only species of Crow at Amoy. The male and female do not appear to differ much in size of bill.

228. Corvus sinensis, Gould.

C. corone of Temm. & Schleg. and von Schrenck.

I have four specimens of this bird—a female from Pekin, an immature male from Foochow, and a male and female from Swatow. The northern birds are larger than the southern, but in essential characters they are the same. The distinctness of the Chinese bird from *C. corone* of Europe Mr. Tristram agrees with me in considering undoubted; and it is hard to understand how, after a comparison, they could ever have been united. *C. sinensis* has a bill more allied to that of the Ravens than to the Jackdaw-like bill of *C. corone*. The bill of the male *C. sinensis* is about one-third bulkier than that of its female, which is about the same proportion larger than that of the male *C. corone*; that organ is, moreover, well culminated, like that of *C. culminatus* of India. Apart from the bill, however, there are numerous other satisfactory distinctions. The whole plumage of *C. sinensis*, except the scapulars, coverts, and secondary-edges, is washed with a green bronze, which in *C. corone* is purplish, and the feathers of the throat and under neck are lanceolate; the latter marked distinction will enable the most superficial observer to distinguish them. The Chinese is, besides, a good deal larger in size and in length of wing. *C. culminatus* has a very similar bill to the Chinese bird. In size, it appears to more nearly equal the European species, and in shades of plumage to be intermediate between it and the Chinese, but it likewise wants the strongly acuminate throat-feathers of *C. sinensis*. The specimens of *C. culminatus* that I have had for comparison are from Calcutta and the Andaman Islands. I have also *C. macrorhynchus*, Temm., and *C. enca*, Horsf., both from Java, sent me by Prof. Schlegel. These are long-billed species, the former being nearly double the size of the latter.

229. Corvus japonensis, Bp.

C. macrorhynchus, Schleg.; Bp. Consp. Av. p. 386.

North China, Amoorland, and Japan.

230. Corvus pastinator, Gould.

C. frugilegus of Temm. & Schleg. and von Schrenck.

An abundant resident from Shanghai to Pekin; extends into Amoorland and Japan. Mr. Tristram agrees with me in consider-

ing Mr. Gould right in separating this bird from the European Rook; in size they are very similar. The Chinese bird is, however, at once distinguishable by the whole of its head being glossed with purple like the back, the European Rook having the head and face glossed with blue-black. But the greatest distinction is in the peculiar black-feathered throat and chin, these parts in *C. frugilegus* being quite bare. My specimen was procured in October, at Pekin, and, being in mature plumage, must be over a year old at the least. More specimens are required to determine whether the throat ever does get bare, like the base of the bill, with advancing age; but if this character fail, the different tints of the head will be sufficient to establish the Chinese bird as a distinct race of Rook.

231. NUCIFRAGA CARYOCATACTES, L.

Said to occur in North China. Reported from Amoorland and Japan.

232. FREGILUS GRACULUS, L.

North China; procured near Tientsin. Not noted from Amoorland or Japan.

COLUMBIDÆ.

233. COLUMBA RUPESTRIS, Bp. Consp. Av. ii. p. 48.

C. leucozonura, Swinhoe, Ibis, 1861, p. 259.

Common about the rocky shores of China in the extreme north, and rocky coast of Mantchuria.

234. TURTUR RUPICOLA (Pall.); Bp. Consp. Av. ii. p. 60.

Found in North China, the Amoor, and Japan. A winter visitant to South China and Formosa.

235. TURTUR CHINENSIS (Scop.); Bp. Consp. Av. ii. p. 63.

A resident species from Canton to Shanghai, and at Formosa.

236. TURTUR HUMILIS (Temm); Bp. Consp. Av. ii. p. 66.

A summer visitant to South China, ranging in that season as far north as Shanghai and into Formosa.

GALLINÆ.

237. SYRRHAPTES PARADOXUS, Pall.

Abundant about the plains of Pekin and Tientsin during winter. Roams about the country in immense flocks, flying in figures, as do Plovers and most sea-birds.

238. CROSSOPTILON MANTCHURICUM, Swinhoe, P. Z. S. 1862, p. 287.

One specimen procured through Dr. Lamprey at Tientsin. Said to have come from Mantchuria.

239. PHASIANUS TORQUATUS, Gmel.

Found throughout China, up into Amoorland.

240. PHASIANUS REEVESII, J. E. Gray.

Central China and borders of Mongolia.

241. THAUMALEA PICTA, L.

China bordering on Thibet and Mongolia.

242. THAUMALEA AMHERSTIÆ (Leadb.).

China bordering on Eastern Thibet.

243. EUPLOCAMUS NYCTHEMERUS, L.

Nycthemerus argentatus, Swainson.

Wooded mountain-country of Southern China.

244. POLYPLECTRON CHINQUIS (Temm.); Blyth's Cat. p. 241.

Specimens in the British Museum from Mr. Reeves, said to have been procured in Southern China.

245. CERIORNIS TEMMINCKII.

Satyra temminckii, Gray.

In British Museum, from Reeves. China.

246. CERIORNIS CABOTI, Gould, Birds of Asia, pt. x.

Said to have been procured in Southern China.

247. FRANCOLINUS SINENSIS.

Tetrao sinensis, Osbeck.
T. perlatus, Gmelin.
T. pintadeus, Scopoli.
T. madagascariensis, Gmel.

A non-perching Francolin, found on the hills of Southern China. Usually met with single, and difficult to flush. Has been introduced into the Mauritius. Male spurred; female with only a wart.

248. BAMBUSICOLA THORACICA.

Perdix thoracica, Temm.
P. sphenura, J. E. Gray, Zool. Misc. no. 1, p. 2.

Male spurred; female with only a wart. For remarks on this and its allied Formosan representative, see The Ibis, 1863, p. 399.

249. PERDIX BARBATA, J. Verreaux, P. Z. S. 1863, p. 62, Pl. IX.

Brought to the Tientsin market from the plains adjoining Eastern Siberia. Mentioned by Pallas as a variety of *P. cinerea* inhabiting Dauria. Procured by Middendorff in the Barabá Steppe, and noted by him in his 'Sib. Reise' as *P. cinerea*.

250. COTURNIX COMMUNIS, Bonnaterre.

Tetrao coturnix, L.
C. dactylisonans, Temm.

Found throughout China, in the north as a summer bird, in the south chiefly as a winter visitant, though many stay to breed. I have procured their eggs at Amoy. It is found also at Japan and in Formosa, but is not noted from the Amoor.

251. EXCALFACTORIA CHINENSIS.

Tetrao chinensis, L.

Has a wide range throughout Southern Asia and its islands to Australia. Found in Southern China and Formosa, and has been introduced into the Mauritius.

252. TURNIX MACULOSA, Temm.

Occurs sparsely throughout China from Canton to Pekin; and I suspect also in Formosa, though I did not procure specimens. Mr. Blyth considers the Chinese race the same as that from Burmah, which he has lately described as *T. blanfordi* (Journ. As. Soc. Beng. 1863, p. 8). He says it holds the same relationship to *T. dussumieri*, Temm., of India, that the *T. sykesi* of India holds to the *T. andalusica* of S. Europe and N. Africa.

253. TURNIX OCELLATA.

Oriolus ocellatus, Scop.
Tetrao luzoniensis, Gmel.
Hemipodius thoracicus, Temm.

Inhabits Southern Asia and its archipelago, to the Philippines. Occurs also in Southern China and Formosa.

GRALLÆ.

254. OTIS TARDA, L.

We frequently hear in China of Bustards, though I have never met any. They are brought to the Tientsin market from the neighbouring plains, and through the kindness of Dr. Lamprey I have been enabled to procure a sternum. This agrees entirely with that of the European Bustard, which is also noted from the Amoor. In South China probably other species occur.

255. GRUS CINEREA, L.

G. cinerea longirostris, Faun. Jap.

North China to Amoorland and Japan. Visits South China in winter in large flocks, frequenting cultivated fields, and feeding on sweet potatoes (*Batatas edulis*).

256. GRUS LEUCOGERANOS, Pall.

North China, Amoorland, and Japan.

257. GRUS VIRIDIROSTRIS, Vieill.

Antigone montignesia, Bp. Consp. Av. p. 100.

North China and Japan. Frequently seen in captivity at Shanghai. Emblem of longevity among the Chinese, and the subject of many pictures and works of art.

258. GRUS MONACHA, Temm.

North China and Japan.

259. GLAREOLA ORIENTALIS, Lath.

In all marshy plains throughout China, as far north as Pekin; also abundant in Formosa. Not noted from the Amoor or Japan.

260. VANELLUS CRISTATUS, Meyer & Wolf.

North China from Shanghai to Pekin and Amoorland. Shot by Captain Blakiston, at Shanghai, in January.

261. LOBIVANELLUS CINEREUS, Blyth, J. A. S. B. xi. p. 587.

Chætusia wagleri, Bp.

Common on the banks of the Yangtsze, Central China, in summer, whence it probably migrates southwards to the plains of Hindostan. A specimen brought by Captain Blakiston agrees entirely with those from India. The *Lobivanellus inornatus* of Japan is said to be distinct. One shot at Amoy was referred by Mr. G. Schlegel to that species, but it may have been the bird that migrates to India. It is said to be extremely rare in Japan; hence it is not unlikely that a few only straggle there, as the bird we procured straggled to Amoy.

262. SQUATAROLA HELVETICA, Gmel.

Winter visitant to the coasts of China and Formosa from the north.

263. CHARADRIUS LONGIPES, Temm.

C. virginicus of my previous lists.

Throughout China and Japan. Many stay to breed about South China and Formosa. The females are smaller than the males, and their eggs unusually small.

264. EUDROMIAS MORINELLUS, L.

Observed by Middendorff in North-eastern Asia in June and August. Procured, according to Cassin, at Hakodadi (North Japan).

265. ÆGIALITES LESCHENAULTII.

Charadrius leschenaultii, Less.
C. geoffroyii, Wagler.
C. asiaticus (*caspius*), Pall.
Hiaticula rufina, Blyth.

On all the coasts of Southern Asia. Somewhat rare on Chinese coast. Common in Formosa, where it stays the whole year and breeds. This appears to be the largest of this group, and has a heavy black bill. *Ægialites hiaticula*, L., of Europe, is said by

Temminck to have been procured from Japan, but I should think it extremely doubtful. Mr. Tristram has an undoubted specimen of this species, shot by himself between Cairo and Suez in February. This is the most westerly occurrence of this bird I have heard of.

266. ÆGIALITES MONGOLICUS.

Charadrius mongolicus, Pall.; Midd. Sib. Reise.
C. ruficollis, Cuv.
C. pyrrhothorax, Temm.
C. cirrhipedesmos, Wagler.
C. sanguineus, Less.
C. rufinellus, Blyth.

Inland plains of North China, Mongolia, and Amoorland. Common in winter in Lower Bengal. It appears rarely, if ever, to come to the sea-coast, and is probably a Dotterel, though it has many affinities with the Sand-plovers.

267. ÆGIALITES CANTIANUS.

Charadrius cantianus, Lath. (*alexandrinus*, Pall.).

Though not noted by von Schrenck from the Amoor, I suspect the summer resort of this bird extends as high up as Kamtschatka. I found it at Talienwan, and in winter we receive large accessions to our resident numbers from the north. It is, I think, entirely a bird of the coast, never being met with inland. The birds that stay to breed on the coasts and islands of South China and Formosa can at once be recognized by their flesh-coloured legs, which in the arrivals from the north are leaden. Our southern birds are, moreover, larger, very pale, in some cases almost white, and never, to my knowledge, attain aught but an indication of the bright rufous and black that adorn the head of the northern form. A similar resident race has been procured on the coast of California, and separated by Cassin as a distinct species under the term *Hiaticula nivosa*. I do not think we can regard this form other than as a climatal or incipient species, or, if the term be preferred, *conspecies*.

268. ÆGIALITES PHILLIPINUS.

Charadrius philippinus, Scopoli.
C. minor, Meyer, and of British authors.
C. curonicus, Beske.

Abundant on the coasts of China and Formosa, where many spend the whole summer. Extends into Amoorland and Japan. Is somewhat an inland bird, and frequently found on the sandy banks of rivers, and in winter on freshly ploughed fields, margins of pools, marshy grounds, and wet rice-fields.

269. HÆMATOPUS LONGIROSTRIS, Gray.

H. ostralegus, L., of my former lists.

Bill an inch and more longer than in *H. ostralegus*, and differently shaped. It never has the white collar, even when immature, and

has more white on the tail, especially on the outer feathers. Winter visitant to south coast of China, thence to the Indian Archipelago. Found in summer at Talienwan. Extends up the coast of Mantchuria to northern latitudes in summer, at which season it also occurs in Japan.

270. HÆMATOPUS NIGER, Pall.

Kurile Isles, Sagalien, and Sea of Ochotsk.

271. RECURVIROSTRA AVOCETTA, L.

Winter visitant to South China. Summers probably in North China and Amoorland.

272. TOTANUS GLOTTIS, L.

T. glottoides, Vigors.

Visits the coasts of China, Japan, and Formosa in winter.

273. TOTANUS STAGNATILIS, Bechst.

Rare on the Chinese coast. Seen occasionally during winter on the coast in small flocks. A specimen procured in Formosa. It also appears to be rare on the coasts of North-eastern Asia; for Middendorff procured it only once on the shores of the Sea of Ochotsk.

274. TOTANUS FUSCUS, L.

Winter visitant to south coast. Specimens procured at Macao and Tientsin.

275. TOTANUS CALIDRIS, L.

Commoner than the last in winter, though both somewhat rare. Specimen procured in Formosa.

276. TOTANUS GLAREOLA, Gmel.

Common in small flocks in marshy places in September and October in South China, just arrived from the north, and evidently bound to more southerly latitudes. Disappears in winter, and returns late in spring, bound north. Never seen on the coast.

277. TOTANUS AFFINIS, Horsf.

I procured one of this species out of a small party in a rice-field near Amoy, on the 12th of September 1859. The flight and note of the bird struck me as peculiar at the time. It is most nearly allied to *T. glareola*, from which it is at once distinguished by the deep olive-tint of the upper parts, the head and back being destitute of spots, by the few whitish spots of its wing-coverts and tertiaries, which are, on the other hand, spotted with black, in these respects resembling *T. ochropus*. The tail, however, is closer to that of *T. glareola*; but the central feathers are more olive, and with few white markings. The breast is washed on the sides with olive-brown, and has no spots. The tarsus is shorter than in either *T. glareola* or *T. ochropus*, as also the bill. Mr. Tristram agrees with me in considering it a good species. It has also considerable affinity with *T. hypoleucus*.

278. TOTANUS OCHROPUS, L.

Seldom found on the coast. Rather solitary in habits. A few stay all the year in South China.

279. TOTANUS BREVIPES, Vieill.

T. pulverulentus (Müll.), Faun. Jap.
T. glareola, Pall.
T. griseopygeus, Gould, Birds of Austr.
T. fuliginosus, G. R. Gray, G. of B. (winter).

Found on Chinese coast in winter, but much commoner during the early part of that season in Formosa. Extends its winter migration to the Indian Archipelago and to Australia. Procured also from Japan, where it probably breeds. Not noted from Amoorland by von Schrenck, but has been procured from Kamtschatka and the Sea of Ochotsk.

280. TOTANUS HYPOLEUCUS, L.

T. empusa, Gould, Birds of Austr.
Tringoides hypoleuca of previous lists.

Everywhere a common resident species on the coast and on banks of rivers. Associates in flocks and parties in winter, and in rigorous weather shifts southwards.

281. MACHETES PUGNAX, L.

From Kamtschatka and Siberia, where it summers, visiting India and interior of China in winter.

282. TEREKIA CINEREA.

Scolopax cinerea, Gmel.
Limosa recurvirostra, Pall.
L. cinerea, apud von Schrenck.

Procured in summer plumage at Tientsin, and noticed as a summer bird in Amoorland. I have never observed it on the South Chinese coast, and it is not improbable that it migrates southwards through the interior. Is a common winter bird in India and its archipelago, and has been procured in that season in Australia.

283. LIMOSA UROPYGIALIS, Gould, Birds of Austr.

Procured only once at Amoy in early spring. Not noted before from any part of East Asia. This is probably the species procured in Java and Timor, and not the *L. lapponica*, as has been recorded. Probably breeds in North-east Asia, and migrates south-easterly, a few occasionally finding their way to the Chinese coast. No short-legged Godwit is noted from Hindostan (see Blyth's 'List'). My specimen is identical with Australian specimens, and was procured at Amoy. Middendorff gives *L. rufa* seu *lapponica* from North-east Asia; but I strongly suspect it will be found to be this species, for both forms could hardly be expected to occur together. *L. rufa* is also recorded by Schlegel from Japan.

284. Limosa ægocephala, L. (*L. melanura*, Leisler).

L. melanuroides, Gould, Birds of Austr.

Never observed on the Chinese coast, and not noted from the Amoor by von Schrenck. Middendorff found young birds on the great Schantar Island on the 11th August. Said to be found on lakes and inland marshes of China, whence it is brought to the Tientsin and Shanghai markets in winter. It is probably from Mantchuria that these birds come, spreading down to the Indian Archipelago southwards, and eastwards to North Australia, to both of which places they resort in winter. Temminck and Schlegel note it from Japan.

285. Pseudoscolopax semipalmatus, Jerdon, Blyth, J. A. S. xvii. 252.

Micropalama tacsanowskia, J. Verreaux, Revue de Zoologie.

Summers in inland Northern China and Mongolia, migrating overland in winter southwards, occasionally into the plains of Hindostan. Messrs. Jerdon and Blyth have procured it near Calcutta and on the Coromandel coast in the cool season. I have one in partially moulted plumage, shot in autumn at Hankow, Central China, and another in full summer plumage from the neighbourhood of Tientsin. In its bright rufous summer garb, and in almost every particular, this bird is a perfect Godwit. You have only to cut off the bill, and it is almost undistinguishable from *Limosa uropygialis*. It forms the same connecting link between *Limosa* and *Scolopax* that *Macroramphus griseus* appears to form between *Totanus* and *Scolopax*.

286. Scolopax rusticola, L.

Very common in North China and Japan during winter. Frequent, but rarer, during the same season on the hills of Southern China. Curiously enough, it is not noted from Amoorland. Specimens identical with the European bird.

287. Gallinago solitaria, Hodgs.

Scolopax hyemalis (Grismann), Midd. Sib. Reise.

I procured a specimen one winter on the hills of Amoy, which was identified by Mr. Blyth as of this species. The specimen was unfortunately never returned to me; so I have not been able to compare it with skins in museums in England. It is said by Messrs. Temminck and Schlegel ('Fauna Japonica') to be also found in South Japan. If so, we can easily account for its presence in Amoy. My specimen haunted for several weeks a mountain stream, and did not care apparently to mix with the Snipes of the rice-fields on the plains. I may here remark that a large Snipe, brought by Captain Blakiston from North Japan, was identical with *G. australis*, Gould, of Australia (see The Ibis, 1863, p. 416).

288. Gallinago megala, Swinhoe, Ibis, 1861, p. 343.

Scolopax palustris, Pall.

This is the Great Snipe of China. I found it on the marshes near Peking in September. At the close of the same month it passes down the coast, being found at Shanghai, Amoy, and Canton for a few days only, and apparently bound further southwards. At the end of April and beginning of May it occurs in South China again for a few days, and is then bound north. During the season of its migrations, I procured it also in S.W. Formosa. It does not appear to have been noted in Amoorland; but Pallas's Great Snipe from Siberia will probably be the same as our bird. Pallas failed to distinguish the Eastern from the Western Great Snipe. His name therefore might with equal propriety be applied to either.

289. GALLINAGO STENURA, Temm.

G. horsfieldii, Gray.

Abundant from Canton to Pekin. It moves about in flocks in winter, but seems to breed in many places throughout China, north and south. Chinese specimens are identical with those from Hindostan and Java.

290. GALLINAGO SCOLOPACINA, Bp.

Scolopax gallinago, L.
S. biclava, Hodgs.

This Snipe appears to be of very general distribution throughout Asia. It is the only one of this genus noted by von Schrenck from Amoorland. In North China it probably breeds; but, as far as my observations go, in South China and Formosa it is only a winter bird.

291. GALLINAGO BURKA (Lath.).

G. brehmi, Kaup.
G. uniclava, Hodgs.

The same peculiarity of fourteen tail-feathers, with the long outermost one, occurs in the majority of my Snipes from Canton and Pekin. This is the *common* Snipe of China, visiting the south in large wisps during winter. Indian skins are identical with those from China. It appears to be the Eastern representative of the foregoing, which occurs more sparsely.

292. GALLINAGO GALLINULA, L.

Said by sportsmen to be abundant at Canton. I have never met with it, and therefore know nothing of its movements. It may retire northwards by an inland route; but von Schrenck does not note it from the Amoor, and it is not recorded as a Japanese bird.

293. RHYNCHEA BENGALENSIS, L.

Scolopax capensis, Gm.
R. orientalis, Horsf.
R. sinensis, Lath.

The Cape, the Indian, and the Chinese bird all appear to be the

same species, the female being much larger, and coloured in a more brilliant and variegated manner. It is somewhat sparsely scattered throughout the plains of China, from Canton to north of Foochow; but I do not think it ever occurs so far up as Shanghai. It is a resident species, and generally found solitary or in very small parties.

294. CALIDRIS ARENARIA.

Charadrius calidris, L.
Tringa tridactyla, Pall.

This bird occurs at Amoy and on the South China coast only in September, October, April, and May, its southward destination being apparently in lower latitudes, and its northward much higher, though it is not noted from Amoorland. A few are occasionally met with the winter through.

295. STREPSILAS INTERPRES, L.

The same remarks may be applied to this as the last. I have procured both these birds in summer as well as winter dress at Amoy.

296. LOBIPES HYPERBOREUS, L.

Noted from Amoorland. Parties come down our coast as early as October, and some do not return till very late. I have procured them off the Amoy coast in May, in nearly complete summer plumage.

297. PHALAROPUS FULICARIUS, L.

I have not yet observed this species in China, but it occurs in winter in Hindostan. Middendorff found it breeding on the 17th July in S.E. Siberia; and it thence doubtless visits the interior of China, if not the coast. It has been procured from Kamtschatka and the Kurile Islands.

298. TRINGA TENUIROSTRIS.

Totanus tenuirostris, Horsf. Linn. Trans. xiii. p. 192.
Schœniclus magnus, Gould, Birds of Austr.
T. crassirostris, Temm. & Schleg. Faun. Jap. 1850.

Noted from Amoorland and Japan. A few occasionally come down the China coast. I have one from Shanghai. Its migrations from the Amoor are doubtless in a more easterly direction, towards Australia, touching at Japan, from both which countries it has been brought.

299. TRINGA CANUTUS, L.

Noted from Amoorland. Extremely rare in China. I have a young specimen from Shanghai.

300. TRINGA MARITIMA, Brünn.

Three specimens procured out of a flock, on the 9th August, by Middendorff in Amoorland, lat. 75°.

301. TRINGA PLATYRHYNCHA, Temm.

Rare on the Chinese coast, but pretty common in early winter on the mud-flats of Formosa.

302. TRINGA RUFESCENS, Vieill.

A single specimen procured by Middendorff, on the 30th June, on the south coast of Sea of Ochotsk.

303. TRINGA CINCLUS, L.

T. chinensis et *T. subarcuata* of my previous lists in The Ibis.

Very abundant on the China coast the winter through. They retire northwards on the approach of summer, but return early, often in nearly full summer plumage.

304. TRINGA SCHINZII, Brehm.

Found by Middendorff amongst flocks of the foregoing, 11th August, on south coast of Sea of Ochotsk.

305. TRINGA ACUMINATA.

Totanus acuminatus, Horsf. Linn. Trans. xiii. p. 192.
Schæniclus australis, Gould, Birds of Austr. vi. pl. 30.

Allied to *T. pectoralis* of America, but quite distinct. Very common on marshes near Pekin in August. It occurs occasionally on South Chinese coast. I procured a few at Amoy in April and May in almost full summer dress. I suspect their migrations are usually more easterly, to Australia.

306. TRINGA DAMACENSIS.

Totanus damacensis, Horsf. Linn. Trans. xiii. p. 192.
Tringa subminuta, Midd. Sib. Reise.

Allied to *T. minuta*, Leisl., but at once distinguished by its very long toes, and by the brown instead of white shafts to its primaries. Middendorff (Sib. Reis.) procured a pair in summer plumage in Siberia. In that plumage they were similar to *T. minuta*, except in the distinctions before stated. I have one in winter plumage from Formosa, two in summer from Amoy, and several sent to me by Mr. Blyth from Calcutta labelled *T. minuta*. I have compared our specimens from China and India, in company with Mr. Tristram, with examples of the European *T. minuta*, and we are agreed in its decided specific distinction. The true *T. minuta* occurs only as a straggler in Siberia, where it is replaced by this species, which doubtless thence ranges in winter into Hindostan in great abundance. These birds occur every year in sparse numbers near Amoy, on inland marshes, early in winter and late in spring, during their migrations. *T. pusilla*, Wils., of America, has longer toes than *T. minuta*, and seems to form a link between it and this species.

307. TRINGA ALBESCENS, Temm.

Visits the South China coast in flocks in September, and again in

April and May. It has probably a long way to travel, for in winter it is found throughout the Indian Archipelago and in Australia. In summer its throat and neck become brick-red, and it then looks much like a miniature of the Sanderling (*Calidris arenaria*). I have in previous lists wrongly referred this species to *T. subminuta*, Midd.

308. TRINGA SUBARCUATA, L.

A specimen in full red summer plumage received from Tientsin. It is also noted from Amoorland. Its migrations do not appear to extend far south, for I have never met with it on the coast below Shanghai.

309. TRINGA TEMMINCKII, Leisl.

Common during the winter in South China, on the banks of inland lakes and marshes.

310. EURINORHYNCHUS PYGMÆUS, Lath.

A large flock of these was observed by Middendorff on the south coast of the Sea of Ochotsk in July.

311. NUMENIUS MINUTUS, Gould, Birds of Austr.

N. minor, Temm. & Schleg. Faun. Jap.

Smaller than *N. borealis* of America, and quite distinct. It is noted from Amoorland and Japan, whence probably it migrates to winter in Australia. A few occur occasionally on the South China coast. I have a pair shot at Amoy on the 29th of April.

312. NUMENIUS PHÆOPUS, L.

Is said to be common in India in winter, whither it probably comes from Siberia, where it occurs in summer, according to Pallas and Middendorff. Temminck notes having procured it from Japan. Hence I include it in my list, though not as yet observed on the Chinese coast.

313. NUMENIUS UROPYGIALIS, Gould, Birds of Austr.

Procured by myself in South-west Formosa in October. Found in Australia and the islands of the Indian Archipelago, in all of which it probably breeds, as I have reason to suppose it does at Formosa. My two specimens are identical with two from Halmaheira, sent me by Professor Schlegel. It differs from the Whimbrel, *N. phæopus*, in having a brown and white-barred rump, and forms the intermediate link between that species and the brown-and-black rumped *N. hudsonicus* of America.

314. NUMENIUS ——?

A species smaller than *N. arcuatus*, with long thin bill, allied to *N. tenuirostris* of North Africa, is noted by Cassin (Proc. Acad. Sci. Phil.) from Hakodadi, North Japan. This species has, unfortu-

nately, not been named. Nothing is known of it except from Cassin's short note.

315. NUMENIUS TAHITIENSIS, Gmel.; Cassin in Perry's Expedition to Japan, ii. p. 228.

This species was procured by the members of the American Expedition to Japan under Commodore Perry. It was previously considered peculiar to Otaheite and the islands of the Pacific. Figures and a good description of it are given in the work named. It may have been only a straggler to the Japanese shores; but I include it in my list on the probability of its also occasionally occurring on the shores of China. I strongly suspect, however, that it is identical with the foregoing *N. uropygialis*.

316. NUMENIUS ARCUATUS, L.

Visits the coasts of China, as far south as Canton, in large flocks in winter, retiring northwards on approach of summer. Von Schrenck does not note it from Amoorland.

317. NUMENIUS MAJOR, Temm. & Schleg. Faun. Jap.

Distinguished from the last by its much longer and heavier bill and by its longer legs. Visits the shores of South China and Formosa in winter, and probably retires to Japan to breed, whence it was originally described.

318. NUMENIUS AUSTRALIS, Gould.

Easily distinguished from *N. arcuatus* and allied species by its barred upper tail-coverts. It is the only Curlew reported from Amoorland. I found it very abundant about the marshes near Pekin in August, but have never observed it on the coasts of South China; hence I should infer that its migrations are in an easterly direction towards Australia, in which country it is found in winter.

319. NUMENIUS RUFESCENS, Gould, P. Z. S. 1862, p. 286.

Appears to be a local race of the last, being, like it, barred on the rump, but much more rufescent. I found it breeding in North Formosa.

320. THRESKIORNIS MELANOCEPHALUS, L.?

This is the only known species to which I can liken the black-headed white Ibises that I met in a flock at Talienwan in July 1860 (see The Ibis, 1861, p. 261). It is found in India, and, as is the case with many other Indian species of birds, probably summers in the interior of North China. It has not been recorded by others from Eastern Asia.

321. IBIS NIPPON, Temm. & Schleg. Faun. Jap.

Breeds probably in Japan, and is found in small parties on the coast near Shanghai and at North Formosa in winter. The immature plumage is grey; that of the adult pure white.

322. PLATALEA MAJOR, Temm. & Schleg. Faun. Jap.

Breeds probably in Japan. A winter visitant to Formosa and the South Chinese coast, as far south as Canton. I have procured it from Swatow.

323. PLATALEA MINOR, Temm. & Schleg. Faun. Jap.

Described from Japan. I have never seen it from China, but it probably occurs on the coast during winter.

324. CICONIA NIGRA, L.

Noted from Amoorland. Said to occur in North China.

325. CICONIA ALBA, L.

Noted from Amoorland. Said to occur in North China.

326. ARDEA CINEREA, L.

Throughout China to Amoorland, Japan, and in Formosa.

327. ARDEA PURPUREA, L.

Interior of Central China. I have specimens from Hankow. Has also been procured from Japan (Temminck).

328. HERODIAS ALBA, L.

Ardea modesta, Gray.
A. syrmatophora, Gould.

Mr. Blyth agrees with me in considering the Great Egret of Europe, Asia, Africa, and Australia the same. It acquires a black bill and long dorsal plumes in summer, in winter the plumes fall away, and the bill of the bird becomes yellow. There is a considerable difference in size between the male and female, the male being much larger. Found throughout China into Amoorland, in Formosa, and probably Japan, though not yet noted from the last place.

329. HERODIAS INTERMEDIA, Wagl.

Ardea egrettoides, Temm.
H. plumifera, Gould, Birds of Austr.

In size this is intermediate between the foregoing and the succeeding. In winter it also has a yellow bill, but that organ is proportionally very short. In summer the bill turns black; it acquires long straight dorsal plumes, not curled upwards as in the next; and the pectoral plumes are like those of the back, not acuminate, thus distinguishing it at once from its near allies. I have a specimen from Hankow, Central China, and have seen it at Tientsin; so I suspect it is widely distributed throughout China. It is also noted from Japan and India, and is probably the same as *H. plumifera* of Australia.

330. HERODIAS GARZETTA, L.

A very lovely bird in full plumage. Very abundant throughout

Southern China, as far north as Shanghai, as also in Formosa. Not noted from Northern China, Amoorland, or Japan.

331. HERODIAS EULOPHOTES, Swinhoe, Ibis, 1860, p. 64, et 1863, p. 418.

Sparsely distributed throughout Southern China, but commonest in North Formosa. Allied to the foregoing, but has a *yellow* bill in summer, the dorsal plumes straight, and the occipital plumes a bunch instead of a few long feathers. In winter it is distinguishable by its very short legs and by its thicker light greenish-yellow bill.

332. BUPHUS COROMANDELIANUS, Scop.

A common summer visitant to South China and Formosa, retiring south on approach of winter. Has been procured, according to Temminck, in Japan.

333. BUTORIDES JAVANICA, Horsfield.

B. virescens, var. *scapularis* (Illig.); von Schrenck, Amurland, p. 437.

A summer visitant to China and Amoorland.

334. ARDEOLA PRASINOSCELES, Swinhoe, Ibis, 1863, p. 421.

A resident species in South China, as far north as Shanghai, extending westwards to Hankow, and southwards probably to Siam. Its nearest ally is the *A. speciosa*, Horsf., of Java, which, however, in mature plumage has the head and neck orange-buff, with long cream-white crest-feathers, instead of having the whole a deep maroon colour.

335. NYCTICORAX GRISEUS, L.

A resident species, abundant throughout China from Canton to Pekin, and in Formosa.

336. NYCTICORAX MELANOLOPHUS, Raffles.

Ardea goisagi, Temm. & Schleg. Faun. Jap.

From Japan and the Indian Archipelago. I observed a bird resembling this near Tientsin (see The Ibis, 1861, p. 344).

337. BOTAURUS STELLARIS, L.

Somewhat sparsely scattered throughout China to Amoorland. I have specimens from Canton and Swatow.

338. ARDETTA FLAVICOLLIS, Lath.

South China, from Canton to Shanghai and in Formosa. A few, I think, stay all the year, though most are summer visitants.

339. ARDETTA CINNAMOMEA, Gmel.

A summer visitant to China, Amoorland, and Japan. A few stay all the year in South China.

340. Ardetta sinensis, Gmel.

Found in summer, from Canton to Tientsin, and in Formosa. On the approach of winter they retire south. I have an undoubted hybrid between this and the last species, procured at Amoy. It curiously combines the characters of both. M. J. Verreaux has mentioned to me an analogous case of a hybrid between *A. cinerea* and *A. purpurea*. Temminck refers the small Japanese Bittern to *A. minuta*, L., of Europe, but I suspect he is wrong in this.

341. Hydrophasianus sinensis, L.

Parra luzoniensis, Gmel.

Interior of Southern and Central China. I have fine specimens in full summer plumage from Hankow.

342. Gallicrex cristatus, Lath.

I consider this bird a summer visitant to South China, from Canton to Shanghai, and also to Formosa. I have specimens in full summer plumage from Hankow; and it was shot by Captain Blakiston's party at Foochow in Szechuen, 1700 miles up the Yangtzse, in May, in a wheat-field near no water.

343. Gallinula chloropus, L.

A resident species throughout China and Formosa. Specimens from there are identically the same as European ones. The Japanese form is said to vary somewhat.

344. Gallinula phœnicura, Penn.

This is I think a summer visitant to China. It is not uncommon during that season from Canton to Tientsin, and in Formosa.

345. Porzana fusca, Shaw.

P. erythrothorax, Temm. & Schlegl. Faun. Jap.

Identical with Indian examples. Varies much in size. Found throughout China, Japan, and Formosa.

346. Porzana minuta, Pall. (*P. pusilla*, Gmel.).

This species is given by Temminck from Japan.

347. Porzana pygmæa, Naumann.

Gallinula bailloni, Vieill.

Procured from Tientsin, and is probably found throughout Central China, as it is throughout Hindostan. Japan (Temminck).

348. Ortygometra crex, L.

Said to have been procured from China. I have never met with the bird there.

349. Rallus striatus, L.

Procured in Formosa, identically the same with Indian and Malayan specimens. It probably also ranges throughout Southern China.

350. Rallus aquaticus, L.

Identical with British examples, except in its having a thicker bill. Specimens received from Tientsin. It probably ranges throughout Northern and Central China. It occurs also in Japan. The Indian race has a thicker bill, and more distinct white striæ on the upper wing-coverts.

351. Fulica atra, L.

Found throughout China, but commoner in the northern half, from Shanghai to Pekin. From the last-named and from Hankow I have specimens identical with the European bird. Occurs also in Japan.

Anseres.

352. Podiceps minor, Gmel.

P. philippensis, Gmel.

Found throughout China and Formosa. In cold, many leave the ponds of the interior and take to the sea. In full plumage, identical with European specimens.

353. Podiceps rubricollis, Lath.

P. subcristatus (Jacq.), von Schrenck, Amurland, p. 493.

P. rubricollis major, Temm. & Schleg. Faun. Jap.

Lakes of North China, up to Amoorland, and in Japan. I have never met with it on the coast.

354. Podiceps auritus, L.

Lakes of Central and Northern China, appearing on the southern coast in severe winter seasons. Japan (von Schrenck). I have a specimen from Amoy.

355. Podiceps cornutus, Lath.

North China to Amoorland. Visits the south coast in winter. I have a specimen from Amoy.

356. Podiceps cristatus, L.

P. cornutus, Pall.

Very common. In winter large numbers appear on the southern coast. Kamtschatka and Japan (Temminck).

357. Colymbus septentrionalis, L.

Very common on the southern coast in winter.

358. Colymbus glacialis, L., var. *adamsii*, Gray.

Sea of Ochotsk (Midd.).

359. Colymbus arcticus, L.

Amoorland (von Schrenck); said to visit the north coast of China.

360. Mergus albellus, L.

North China in winter. Abundant in the Tientsin market.

361. MERGUS SERRATOR, L.

Common throughout China.

362. MERGUS MERGANSER, L.

North China. Abundant in markets at Tientsin in winter. It is probably also a summer bird in the large marshes of that neighbourhood.

363. CYGNUS MUSICUS, Bechst.

Visits North China and Japan in winter (Temm.).

364. CYGNUS MINOR, Pall.

C. bewickii, Yarr.

Commoner than the foregoing. Comes down in winter occasionally as far south as Canton.

365. ANSER CYGNOIDES, L.

A large wild Goose, answering to von Schrenck's description of the so-called stock of the Chinese domestic Goose, visits the shores of North China in winter, and is frequently procurable in the market; but it has no distinct knob on the bill.

366. ANSER HYPERBOREUS, Pall.

Sea of Ochotsk (Midd.); Japan and Kamtschatka (Temm. & Sieb.).

367. ANSER GRANDIS, Gmel.

Shanghai in winter.

368. ANSER SEGETUM, Gmel.

Down to Canton in winter.

369. ANSER FERUS.

A. cinereus (Meyer & Wolf); von Schrenck.

To Canton in winter.

370. ANSER ALBIFRONS, Penn.

All these are procurable during winter in the Shanghai and Tientsin markets.

371. ANSER ERYTHROPUS (Linn.) (*A. minutus*, Naumann); Midd. Sib. Reise.

372. ANSER LEUCOPSIS, Bechst.; Midd. Sib. Reise.

373. ANSER BERNICLA, Ill.; Midd. Sib. Reise.

374. ANSER RUFICOLLIS, Pall.; Midd. Sib. Reise.

375. ANSER BRENTA, Pall.

Sea of Ochotsk (Midd.).

376. Aix galericulata, L.

Found in the lakes of Central China and neighbourhood of Ningpo in winter. Said to breed in Amoorland.

377. Tadorna vulpanser, Linn.

378. Casarca rutila, Pallas.

379. Anas boschas, L.

380. Anas pœcilorhyncha, Temm.

381. Anas glocitans, Pall.

382. Anas falcaria, Pall.

383. Anas crecca, L.

384. Anas querquedula, L.

385. Anas strepera, L.; Midd. Sib. Reise.

386. Anas acuta, L.

387. Anas penelope, L.

388. Anas stelleri, Pall. (Midd. Sib. Reise).

389. Anas clypeata, L.

390. Anas spectabilis, L. (Midd. Sib. Reise).

391. Anas histrionica, L. (von Schrenck).

392. Anas clangula, L.

393. Fuligula marila, L.

394. Fuligula cristata, Leach.

395. Œdemia nigra, L. (*A. atra*, Pall.).

North and East Siberia (Pallas). Japan (Temminck).

396. Œdemia americana, Swainson.

Shot by Captain Blakiston's party at Chinkiang, on the Yangtsze, in winter.

397. Œdemia fusca, L.

Amoorland (Midd.).

398. Harelda glacialis, L.

Amoorland (Midd.).

399. Phalacrocorax carbo, L.

Graculus carbo, L.; Cassin, Perry's Exped. ii. p. 239.

At Yeddo in April.

I can find no special points of difference between my Amoy spe-

cimens and the English bird. It only winters in South China, returning to the north and Amoorland to breed.

400. PHALACROCORAX CAPILLATUS, Faun. Jap. pl. 83.

Carbo filamentosus, Temm. & Schleg. Faun. Jap. p. 129.

This species from Japan is recognized as distinct by Temminck, and well described and figured in the 'Fauna Japonica.' I admit it on the authority of that work, though I have never met with it in China.

401. PHALACROCORAX BICRISTATUS, Pall.

Sea of Ochotsk (Midd.). Also Japan, according to Temminck and Schlegel, 'Fauna Japonica,' where it is described and figured. A straggler was procured one winter at Amoy, South China.

402. PELECANUS ONOCROTALUS, L.

Said by Temminck to have been procured in Japan. From East Europe and Hindostan.

403. PELECANUS PHILIPPENSIS, Gmel.

This bird visits the south coast of China during winter in small parties.

404. SULA FUSCA, Shaw.

A bird from Shanghai is of this species. I have never met with it on the Chinese coast. It is recorded in the 'Fauna Japonica' from Japan.

405. LARUS NIVEUS, Pall.; Bp. Consp. Av. ii. p. 224.

L. canus, var. *major*, Midd. Sib. Reise.

The Eastern representative of *L. canus*, with larger and stronger bill; irides yellowish grey; eyelids red; bill unspotted, greenish yellow; legs yellowish green. Is found in Kamtschatka and North-eastern Asia, visiting the south coast in winter. I have several from Amoy in all plumages, and one without a hind claw. The immature birds that reach us have always the back more or less grey, proving the plumage completed in two years.

406. LARUS TRIDACTYLUS, var. BRACHYRHYNCHUS.

Rissa brachyrhyncha, Gould.
Gavina citrirostris, Bruch.; Bp. Consp. Av. ii. p. 226.

The Eastern representative of *Rissa tridactyla*, L. Found in Kamtschatka. Not yet procured in China. Thus distinguished by Bonaparte:—"Minor: alba, pallio plumbeo-cano: remigibus primariis griseis, *nec intus* albis, extimis duabus apice late nigris; tertia, quarta et quinta fascia subapicali nigra; sexta macula tantum nigra in pogonio externo: rostro brevi, robusto, incurvo, flavissimo: pedibus rubro-flavis.

"Long. 14 poll. Rostr. $1\frac{1}{3}$. Al. 12 poll. Caud. $4\frac{1}{2}$. Tars. 1 poll."

407. Larus crassirostris, Vieill.

L. melanurus, Temm. & Schleg. Faun. Jap.

Albus, dorso alisque fusco-cinereis; remigibus primariis nigris, ceteris cum tectricium apicibus albis; cauda alba, fascia subterminali latissime nigra: rostro validiusculo, flavido, apice nigro annulato: pedibus fusco-carneis.

Long. 17 poll.

This species breeds in Japan and Talienwan, repairing in large numbers to the South China coast. In full plumage it can always be distinguished from *L. niveus* by its black tail-band, its much darker mantle, and by its large bill, banded at the end with black and crimson. The immature are very much browner than those of the other bird. The different stages of its plumage have been well figured in the 'Fauna Japonica.' I have numbers of specimens from various parts of China,

408. Larus glaucescens, Licht.; Bp. Consp. Av. ii. p. 216.

L. glaucus, Brünn.; Midd. Sib. Reise.

L. brachyrhynchus, Gould.

Ex Ocean. Pac., Arct. et Kamtschatka. Not yet met with on the coasts of China or Japan. Simillimus *L. glauco*, sed minor (long. 2 ped.), et remigibus *perlaceis*, nec nigris nec albis, apice tantum candidis: rostro flavo, angulo mandibulæ aurantiaco.

409. Larus leucopterus, Faber; Midd. Sib. Reise.

A small form of the preceding (length 20 inches), with comparatively longer wings, said by Middendorff to occur also in North-east Asia.

410. Larus occidentalis, Aud. Synop. Birds of Am. p. 328.

"Bill robust, compressed, yellow, with an orange-red patch toward the end of the lower mandible; iris light hazel; feet flesh-coloured; head, neck, lower parts, rump, and tail pure white; back and wings light greyish blue, of a deeper tint than in *L. argentatus*; edges of the wings and extremities of the quills white; first seven quills greyish black toward the end, that colour including the outer webs and the greater part of the inner of the two first, and on the rest gradually diminishing, so as on the seventh merely to form a subterminal bar; the first quill with a patch of white on both webs near the end; the tips of all white.

"This species, which is very intimately allied to *Larus argentatus*, is remarkable for the great depth and comparative shortness of its bill."—*Aud.*

Length 27 inches; wing 18½; tail 8¼; bill, along culmen, 2½; height at angle $\frac{9}{10}$.

The above description answers exactly to the large form of Gull, allied to *L. argentatus*, that visits our southern coasts in winter. I have frequently procured them at Amoy in that season in all stages, but more frequently in the immature. It is the West American re-

presentative race, extending probably to Kamtschatka, whence, doubtless with many other sea-birds, it wends southwards down our line of coast. I have two in very complete plumage. From observation, I should say that these birds require full three years for change into adult attire.

411. Larus cachinnans, Pallas.

L. argentatus, var. *major*, von Schrenck.

Amoorland.

Length 22½ inches; wing 16½–18; tail 7; tarsi 2½; bill, along culmen, 2¼; height at angle $\frac{7}{10}$.

This smaller representative of *L. argentatus* bears to the preceding species the same relation that *L. leucopterus* does to *L. glaucus*, its wings being relatively longer. It is a commoner winter visitant than the former to Amoy, whence I have procured several both adult and immature. It has a darker more slaty back than *L. argentatus*, and is considered by some an intermediate link between that species and *L. fuscus*. It summers in N.E. Asia. Specimens vary a good deal in size and proportions, but I have never procured any exactly intermediate between the largest of this and the smallest of *L. occidentalis*.

412. Chroicocephalus ichthyaëtos, Pall.

This monster black-capped Gull is noted by Cassin as procured at Hakodadi (see Perry's 'Expedition to Japan,' vol. ii. p. 252). It is said to be a bird of the Caspian and Red Seas, and to occur abundantly in the Bay of Bengal. It is not stated to be found in Amoorland or Kamtschatka; but it possibly makes its way to Japan, following the course of the warm Gulf-stream.

413. Chroicocephalus brunneicephalus, Jerdon.

L. ridibundus, var. *major*, Midd. Sib. Reise.

The Siberian and Japanese bird would appear, from descriptions, to be the same as the Brown-hooded Gull of India. Its range extends to Kamtschatka. I have a specimen from India, forwarded to me by Mr. Blyth.

414. Chroicocephalus capistratus, Temm.

Larus brunneicephalus, Cassin, Perry's 'Expedition to Japan,' vol. ii. p. 232.

This comes to Amoy in the winter. I have one from Amoy, and another from Macao; and Cassin notes the occurrence of a similar bird from Hakodadi. It is smaller than the European *C. ridibundus*, and has a more slender bill, and is doubtless its representative in the East. It answers well to the description of *C. capistratus*, Temm., which has occurred in Great Britain, and which Mr. Tristram and others are inclined to believe is only a variety of *C. ridibundus*. The specimens, however, that have occurred in Europe might possibly have been stragglers from the East.

415. Chroicocephalus kittlitzii, Licht.

Easily distinguished by its short, thick, *black* bill. It acquires a deep-black hood in summer. I have it in both summer and winter plumage from Amoy, where it occurs in large numbers the winter through, ascending rivers at fall of tide in search of mollusks and small crustaceans. It is said to summer in Kamtschatka and N.E. Asia.

416. Chroicocephalus sabinii, Leach.

417. Chroicocephalus minutus, Pall.

Both birds of the British lists. I introduce them from the fact of Middendorff stating that they occur on the shores of the Sea of Ochotsk.

418. Lestris pomarina, Temm.
419. Lestris parasita, Boie.
420. Lestris buffonii, Boie.

Said by Middendorff to occur on the shores of the Sea of Ochotsk. None of them have yet been obtained in China.

421. Rhynchops albicollis, Swainson.

Southern Ocean. Said occasionally to occur on the coast of Southern China.

422. Sylochelidon caspia.

Sterna caspia, Latham.
Sylochelidon strenuus, Gould, B. of Austr.

Visits the coasts of China in winter. I have specimens from Amoy.

423. Gelochelidon anglica.

Sterna anglica, Montagu.

Said to wander occasionally to the coast of South China in winter.

424. Hydrochelidon indica.

Viralva indica, Stephens.
Sterna hybrida, Pallas.
S. leucopareia, Natterer.

A common resident on the marshy plains of S.W. Formosa. I have not observed it elsewhere in China.

425. Hydrochelidon nigra.

Sterna nigra, L.
S. fissipes, Pall.
S. leucoptera, Temm.

Found throughout China, into Amoorland. I have a specimen in full summer plumage from Amoy, and several in a variety of plumages from near Pekin.

426. THALASSEUS CRISTATUS.

Sterna cristata, Stephens.
S. pelecanoides, King.
S. velox, Rüppell.

Seas of Southern China. Numbers breed yearly on the rocks of North Formosa.

427. STERNA MACRURA, Naum.; Midd. Sib. Reise.

Said to occur in N.E. Asia.

428. STERNA FULIGINOSA, Temm. & Schleg. Faun. Japon.

Procured as yet only from Japan.

429. STERNA HIRUNDO, L.

S. fluviatilis, Naumann.

Central China; never yet observed on the coast. I have a specimen from Hankow.

430. STERNA LONGIPENNIS, Nordmann; von Schrenck, Amurland, Vögel, p. 512.

From Amoorland, probably descending into North China. I have never met with it. Allied to the last, but with *black* bill and longer wings.

431. STERNULA MINUTA, L.

Visits the Chinese coast in winter. I have specimens from Amoy.

432. STERNULA SINENSIS, Gmel.; Swinhoe, Ibis, 1863, p. 429.

S. sumatrana, Raffles.

A common summer species in Formosa, breeding in large numbers on the precipitous rocky coast on the eastern side of the island. I have also specimens in various stages of plumage from Hankow, showing that it also breeds in Central China. I have never met with it on the Chinese coast; but from its being found in the Malayan archipelago, I should fancy that it migrates thither in winter.

433. ANOUS STOLIDUS.

Sterna stolida, L.

Found in South China Sea; breeds on the eastern rocks of Formosa, whence I have a pair.

434. DIOMEDEA BRACHYURA, Temm.
435. DIOMEDEA NIGRIPES, Audubon.

} Seas of Southern China, the former ranging as far north as Japan. These are the only two species of Albatros found north of the line. For remarks on them, see Ibis, 1863, p. 431.

436. Procellaria glacialis.

Procellaria glacialis, L., var. *pacifica*, Aud.; Bp. Consp. Av. ii. p. 187.

Kurile Islands and Amoorland.

437. Procellaria desolata, Gm.; Bp. Consp. Av. ii. p. 189.

Kamtschatka.

438. Thalassidroma leachii, Temm.; Bp. Consp. Av. ii. p. 195.

Amoorland.

439. Nectris tenuirostris, Temm.; Bp. Consp. Av. ii. p. 202.

Puffinus tenuirostris, Faun. Jap. pl. 86.

Corea and Japan.

440. Puffinus leucomelas, Temm.; Bp. Consp. Av. ii. p. 205.

Procellaria æquinoctialis, Pall.

Japan (Temm. Pl. Col. 587).

441. Uria antiqua, Penn.

U. senicula, Pall.

Synthliboramphus antiquus, Brandt.

Amoorland (v. Schrenck), Japan (Faun. Jap.).

442. Uria umizusume, Temm. & Schl.

Synthliboramphus temminckii, Brandt.

Japan (Faun. Jap.).

443. Uria (Cepphus) carbo, Pall.; von Schrenck, Amurland, p. 496.

Amoorland.

444. Uria (Cepphus) columba, Pall.

Sea of Ochotsk.

445. Uria (Cepphus) lomvia, Brünn.

Sea of Ochotsk.

446. Alca torda, L.

Japan (Faun. Jap.).

447. Ceratorhyncha monocerata.

Alca monocerata, Pall.

Hakodadi, North Japan (Cassin, Perry's Exped. ii. p. 233).

448. Phaleris cristatella, Pall.; von Schrenck, p. 500.

Amoorland.

449. Phaleris mystacea, Pall.
Sea of Ochotsk, Japan (Cassin).

450. Phaleris tetracula, Pall.; Midd. Sib. Reise.
N. E. Asia.

451. Ombria psittacula, Pall.; Midd. Sib. Reise.
South Sea of Ochotsk.

452. Mormon cirrhatum, Pall.; von Schrenck, p. 503.
Amoorland.

453. Mormon corniculatum, Kittlitz; Midd. Sib. Reise.
South coast and islands of Sea of Ochotsk.

454. Mormon glacialis, Leach.
Kamtschatka, Kurile Islands, and Saghalien (Midd.).

In the above list, down to No. 254 (*Otis tarda*), I have restricted myself to those birds that I know from personal observation, or believe on reliable evidence, to occur in China limited—that is, from Canton to the borders of Mantchuria. Beyond that number, I have included all the species that I have been able to find recorded from North-eastern Asia and its islands. These are chiefly sea-birds, which, as every naturalist knows, are of an erratic nature, and often in severe winters turn up in very low latitudes on the same line of coast. I have in every case quoted the authority for the localities given.

For the sake of comparison with the land-birds of China, I subjoin comparative lists of the land-birds of Japan, Amoorland, and Formosa. My authorities for the first of these have been the 'Fauna Japonica,' Cassin's articles in Perry's 'Expedition to Japan' and in the 'Proceedings of the Academy of Natural Sciences of Philadelphia,' and Captain Blakiston's two papers in The Ibis*. For the second I have resorted to Middendorff's 'Sibirische Reise' and von Schrenck's 'Amurland.' The third I have added from my articles on the Ornithology of Formosa in The Ibis, 1863, pp. 198, 250, 377.

The lists are as complete as I have been able, with these references, to make them. In the Japanese list, those marked "(Temminck)" are inserted from von Schrenck's "Schlussfolgerungen," at the end of his 'Birds of Amoorland;' and I am therefore not responsible for the authority. There are some birds so given which I cannot believe to be Japanese; these I have marked with notes of surprise. *Thaumalea picta* is certainly not a Japanese bird. I have, however, thought it best for the present to leave them as they stand for the criticism of future explorers.

* See The Ibis, 1862, p. 309, and 1863, p. 97.

Amoorland.	No.
Aquila nævia, *Briss.*	1
Haliaëtos albicilla, *L.*	2
—— pelagica, *Pall.*	3
Pandion haliaëtus, *L.*	4
Milvus melanotis, *T. & S.*	5
Falco candicans, *Gmel.*	6
—— peregrinus, *L.*	7
—— subbuteo, *L.*	8
—— vespertinus, *L.*	9
Tinnunculus alaudarius, *Briss.*	10
Astur palumbarius, *L.*	11
Accipiter nisus, *L.*	12
Circus cyaneus, *L.*	13
Nyctea nivea, *Daud.*	14
Glaucidium passerinum, *L.*	15
Asio otus, *L.*	16
—— brachyotus, *L.*	17
Bubo maximus, *Siebold*	18
Ulula uralensis, *Pall.*	19
Nyctale funerea, *Lath.*	20

Japan.	No.
Aquila chrysaëtos, *L.*?	1
Haliaëtos albicilla, *L.*	2
—— pelagica, *Pall.*	3
Pandion haliaëtus, *L.*	4
Buteo poliogenys, *T. & S.*	5
—— japonicus, *T. & S.*	6
—— hemilasius, *T. & S.*	7
Pernis apivorus, *L.*	8
Milvus melanotis, *T. & S.*	9
Falco candicans, *Gmel.*	10
—— peregrinus, *L.*	11
Tinnunculus japonicus, *Bp.*	12
Astur palumbarius, *L.*	13
Accipiter nisus, *L.*	14
—— gularis, *T. & S.*	15
Circus cyaneus, *L.*	16
—— æruginosus, *L.* (*Blakiston*)	17
Ninox japonicus, *T. & S.*	18
Asio brachyotus, *L.*	19
Scops semitorques, *T. & S.*	20
—— japonicus, *T. & S.*	21
Ulula rufescens, *T. & S.*	22
Syrnium aluco, *L.* (*Temminck*)	23
Strix flammea, *L.* (*Temminck*)	24

Formosa.	No.
Pandion haliaëtus, *L.*	1
Buteo japonicus, *T. & S.*	2
Milvus melanotis, *T. & S.*	3
Falco peregrinus, *L.*	4
Tinnunculus japonicus, *Bp.*	5
Spizaëtos orientalis, *T. & S.*	6
Accipiter gularis, *T. & S.*	7
Circus spilonotus, *Kaup*	8
Ninox japonicus, *T. & S.*	9
Athene pardalota, *Swinhoe*	10
Scops semitorques, *T. & S.*	11
Bubo caligatus, *Swinhoe*	12

Amoorland.	No.
Nyctale barbata, *Pall.* (*Midd.*)	21
Caprimulgus jotaka, *T. & S.*	22
Acanthylis caudacuta, *Lath.*	23
Upupa epops, *L.*	24
Cuculus canorus, *L.*	25
Hierococcyx fugax, *Horsf.*	26
Yunx torquilla, *L.*	27
Gecinus canus, *L.*	28
Dryocopus martius, *L.*	29
Picus major, *L.*	30
—— minor, *L.*	31
—— leuconotus, *Bechst.*	32
Apternus tridactylus, *L.*	33
Alcedo bengalensis, *Lath.*	34
Certhia familiaris, *L.*	35
Sitta europæa, *L.* (?)	36
Parus ater, *L.*	37
—— cyanus, *Pall.*	38
—— kamtschatkensis, *Bp.*	39
Mecistura caudata, *L.*	40

Japan.	No.
Caprimulgus jotaka, *T. & S.*	25
Upupa epops, *L.*	26
Cuculus canorus, *L.*	27
Yunx torquilla, *L.*	28
Gecinus awokera, *T. & S.*	29
Dryocopus martius, *L.* (*Blakiston*)	30
Picus leuconotus (*Blakiston*)	31
—— kisuki, *T. & S.*	32
Halcyon coromandelianus, *Scop.*	33
Alcedo bengalensis, *Lath.*	34
Ceryle lugubris, *T. & S.*	35
!! Coracias garrula, *L.* (*Temminck*)	36
Certhia familiaris, *L.*	37
Sitta roseilia, *Bp.*	38
Parus varius, *T. & S.*	39
—— minor, *T. & S.*	40
—— ater, *L.* (*Blakiston*)	41
!! —— cæruleus, *L.* (*Temminck*)	42
—— kamtschatkensis, *Bp.* (*Blakiston*)	43
Mecistura trivirgata, *T. & S.*	44

Formosa.	No.
Caprimulgus stictomus, *Swinhoe*	13
Cypselus vittatus, *T. & S.*	14
—— subfurcatus, *Blyth*	15
Cuculus canorus, *L.*	16
—— kelungensis, *Swinhoe*	17
Centropus viridis, *Scop.*	18
Gecinus tancola, *Gould*	19
Picus insularis, *Gould*	20
—— kaleënsis, *Swinhoe*	21
Megalæma nuchalis, *Gould*	22
Halcyon coromandelianus, *Scop.*	23
Alcedo bengalensis, *Lath.*	24
Parus castaneiventris, *Gould*	25
Alcippe morrisonia, *Swinhoe*	26
—— brunnea, *Gould*	27

Amoorland.	No.
Alauda arvensis, *L.*	41
Otocorys alpestris, *L.*	42
Anthus aquaticus, *Bechst.* (*Midd.*)!	43
—— cervinus, *Pall.* (*Midd.*)	44
—— japonicus, *T. & S.*	45
—— agilis, *Sykes*	46
Budytes flava, *L.*	47
Motacilla boarula, *L.*	48
—— ocularis, *Swinhoe*	49
—— luzoniensis, *Scop.*	50
Cinclus pallasi, *Temm.*	51
Turdus chrysolaus, *T. & S.*	52
—— daulias, *Temm.*	53
—— fuscatus, *Pall.*	54
—— naumanni	55
Oriolus chinensis, *L.*	56

Japan.	No.
Alauda japonica, *T. & S.*	45
Otocorys alpestris, *L.*	46
! Anthus aquaticus, *Bechst.* (*Temm.*)	47
—— cervinus, *Pall.* (*Temm.*)	48
—— japonicus, *T. & S.*	49
—— agilis, *Sykes*	50
? Budytes rayii, *Yarr.*	51
Motacilla boarula, *L.*	52
—— japonica, *Swinhoe*	53
Cinclus pallasi, *Temm.*	54
Microscelis amaurotis, *T. & S.*	55
Oreocincla heinei, *Bp.*	56
Turdus sibiricus, *Pall.*	57
—— cardis, *T. & S.*	58
—— chrysolaus, *T. & S.*	59
—— daulias, *T. & S.*	60
—— pallens, *Pall.*	61
—— naumanni, *Temm.* (*Blakiston*)	62
Merula mandarina, *Bp.*	63
Petrocincla manilensis, *Bodd.*	64

Formosa.	No.
Alauda cœlivox, *Swinhoe*	28
Anthus cervinus, *Pall.*	29
—— agilis, *Sykes*	30
—— richardi, *Vieill.*	31
Budytes taivana, *Swinhoe*	32
Motacilla boarula, *L.*	33
—— ocularis, *Swinhoe*	34
—— japonica, *Swinhoe*	35
—— luzoniensis, *Scop.*	36
Cinclus pallasi, *Temm.*	37
Hypsipetes nigerrimus, *Gould*	38
Ixos sinensis, *Gmel.*	39
Spizixos semitorques, *Swinhoe*	40
Oreocincla hanci, *Swinhoe*	41
Turdus chrysolaus, *T. & S.*	42
—— daulias, *T. & S.*	43
—— pallens, *Pall.*	44
—— fuscatus, *Pall.*	45
—— naumanni, *Temm.*	46
Petrocincla manilensis, *Bodd.*	47
Oriolus chinensis, *L.*	48
Psaropholus ardens, *Swinhoe*	49
Herpornis xanthochlora, *Hodgs.*	50
Garrulax taivanus, *Swinhoe*	51
—— ruficeps, *Gould*	52

Amoorland.	No.
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.....	
.....	
Pericrocotus cinereus, *Lafresn.*	57
.....	
.....	
Dicrurus macrocercus, *Lath.*	58
.....	
Lanius excubitor, *L.* (*Midd.*)!	59
—— phœnicurus, *Pall.*	60
Hirundo gutturalis, *Scop.*	61
—— daurica, *L.*	62
Chelidon lagopoda, *Pall.*	63
Cotyle riparia, *L.*	64
Hemichelidon sibirica, *Gmel.*	65
Butalis latirostris, *Raffles*	66
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Cyanoptila cyanomelæna, *T. & S.*	67
Erythrosterna leucura, *Gmel.*	68
—— luteola, *Pall.*	69
Ianthia cyanura, *Pall.*	70
Ruticilla aurorea, *Pall.*	71
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Saxicola saltatrix, *Mén.* (*Midd.*)	72
Pratincola indica, *Blyth*	73
Accentor alpinus, *Gmel.*	74
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Japan.	No.
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! Lanius excubitor, *L.* (*Temm.*)	65
—— bucephalus. *T. & S.*	66
Hirundo gutturalis, *Scop.*	67
—— daurica, *L.*, var.	68
Chelidon blakistoni, *Swin.* (*Blakiston*) ..	69
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.....	
Butalis latirostris, *Raffles*	70
.....	
Xanthopygia narcissina, *T. & S.*	71
Tchitrea principalis, *T. & S.*	72
.....	
Cyanoptila cyanomelæna, *T. & S.*	73
.....	
Erythrosterna luteola, *Pall.*	74
Ianthia cyanura, *Pall.*	75
Ruticilla aurorea, *Pall.*	76
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.....	
Pratincola indica, *Blyth*	77
.....	
Accentor rubidus, *T. & S.*	78
Erithacus komadori, *T. & S.*	79
—— akahige, *T. & S.*	80

Formosa.	No.
Garrulax pœcilorhynchus, *Gould*	53
Pomatorhinus musicus, *Swinhoe*	54
—— erythrocnemis, *Gould*	55
Myiophonus insularis, *Gould*	56
Pericrocotus cinereus, *Lafres.*	57
—— griseigularis, *Gould*	58
Graucalus rex-pineti, *Swinhoe*	59
Dicrurus macrocercus, *Lath.*	60
Chaptia brauneana, *Swinhoe*	61
Lanius shach, *L.*, var.	62
—— lucionensis, *Strickl.*	63
Hirundo gutturalis, *Scop.*	64
—— daurica, *L.*, var.	65
.....	
Cotyle sinensis, *J. E. Gray*	66
.....	
Butalis latirostris, *Raffles*	67
—— griseisticta, *Swinhoe*	68
.....	
Tchitrea principalis	69
Myiagra azurea, *Bodd.*	70
.....	
.....	
.....	
Ianthia cyanura, *Pall.*	71
Ruticilla aurorea, *Pall.*	72
—— fuliginosa, *Vigors*	73
.....	
Pratincola indica, *Blyth*	74
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Amoorland.	No.
Calliope kamtschatkensis, *Gmel.*	75
Locustella hendersonii, *Cassin*	76
—— ochotensis, *Midd.*	77
—— certhiola, *Pall.*	78
Calamoherpe bistrigiceps, *Swinhoe*	79
—— aëdon, *Pall.*	80
Phyllopneuste fuscata, *Blyth*	81
—— borealis, *Blasius*	82
Reguloides superciliosa, *Gmel.*	83
Regulus cristatus, *L.*	84
Zosterops erythropleurus, *Swinhoe*	85
Ampelis garrula, *L.*	86
—— phœnicoptera, *T. & S.*	87
Fringilla montifringilla, *L.*	88
Cannabina linaria, *L.*	89
Chrysomitris spinus, *L.*	90
Carpodacus erythrinus, *Pall.*	91
—— roseus, *Pall.*	92
Corythus enucleator, *L.*	93

Japan.	No.
Calliope kamtschatkensis, *Gmel.*	81
Locustella hendersonii (*Cassin*)	82
—— ochotensis (*Midd.*) (*Blakiston*)	83
Calamoherpe orientalis, *T. & S.*	84
—— cantans, *T. & S.*	85
—— cantillans, *T. & S.*	86
Cisticola schœnicola, *Bp.*	87
?! Sylvia stricapilla, *L.* (*Temm.*)	88
Phyllopneuste coronata, *T. & S.*	89
Regulus japonicus, *Bp.*	90
Zosterops japonicus, *T. & S.*	91
Ampelis garrula, *L.*	92
—— phœnicoptera, *T. & S.*	93
Fringilla montifringilla, *L.* (*Temm.*)	94
Cannabina linaria, *L.* (*Temm.*)	95
Chrysomitris spinus, *L.* (*Temm.*)	96
Chlorospiza sinica, *L.*	97
—— kawariba, *T. & S.*	98

Formosa.	No.
Calliope kamtschatkensis, *Gmel.*	75
Calamoherpe orientalis, *T. & S.*	76
—— canturians, *Swinhoe*	77
—— minuta, *Swinhoe*	78
Drymœca extensicauda, *Swinhoe*	79
—— flavirostris, *Swinhoe*	80
Suya striata, *Swinhoe*	81
Prinia sonitans, *Swinhoe*	82
Cisticola schœnicola, *Bp.*	83
—— volitans, *Swinhoe*	84
Phyllopneuste fuscata, *Blyth*	85
—— coronata, *T. & S.*	86
—— sylvicultrix, *Swinhoe*	87
Reguloides superciliosa, *Gmel.*	88
Zosterops simplex, *Swinhoe*	89
Chlorospiza sinica, *L.*	90

Amoorland.	No.
Pyrrhula orientalis, *T. & S.*	94
Uragus sibiricus, *Pall.*	95
Coccothraustes vulgaris, *Ray*	96
Loxia curvirostra, *L.*	97
—— leucoptera, *Gmel.*	98
Passer montanus, *L.*	99
Euspiza rutila, *Pall.*	100
—— aureola, *Pall.*	101
Emberiza pityornis, *Pall.*	102
—— spodocephala, *Pall.*	103
—— ciopsis, *Bp.*	104
—— rustica, *Pall.*	105
—— polaris, *Midd.*	106
—— pusilla, *Pali.*	107
Schœnicola passerina, *Pall.*	108
Plectrophanes nivalis, *L.*	109
Centrophanes lapponica, *L.*	110
Sturnus cineraceus, *T. & S.*	111
Hetærornis dauricus, *Pall.*	112
Pica caudata, *Ray*	113
Cyanopica cyanea, *Pall.*	114
Perisoreus infaustus, *L.*	115

Japan.	No.
Pyrrhula orientalis, *T. & S.*	99
Uragus sanguinolentus, *T. & S.*	100
Eophona personata, *T. & S.*	101
Coccothraustes vulgaris, var.	102
Loxia curvirostra, *L.*	103
—— leucoptera, *Gmel.* (*Temm.*)	104
Munia acuticauda, *Hodgs.* (*Swinhoe*)	105
Passer montanus, *L.*	106
—— russatus, *T. & S.*	107
Euspiza rutila, *Pall.*	108
—— sulphurata, *T. & S.*	109
Emberiza spodocephala, *Pall.*	110
—— ciopsis, *Bp.*	111
—— rustica, *Pall.*	112
—— fucata, *Pall.*	113
—— variabilis, *Temm.*	114
—— elegans, *T. & S.*	115
Schœnicola passerina (*Blakiston*)	116
Sturnus cineraceus, *T. & S.*	117
Hetærornis pyrrhogenys, *T. & S.*	118
Pica caudata, var.	119
Cyanopica cyanea, var.	120

Formosa.	No.
Munia acuticauda, *Hodgs.*	91
—— topela, *Swinhoe*	92
Passer montanus, *L.*	93
—— russatus, *T. & S.*	94
Euspiza aureola, *Pall.*	95
—— sulphurata, *T. & S.*	96
Emberiza spodocephala, *Pall.*	97
—— ciopsis, *Bp.*	98
—— fucata, *Pall.*	99
Sturnus cineraceus, *T. & S.*	100
Hetærornis sinensis, *Gmel.*	101
Acridotheres cristatellus, *L.*	102
Pica media, *Blyth*	103
Urocissa cærulea, *Gould*	104
Dendrocitta sinensis, var.	105

Amoorland.	No.
Garrulus brandti, *Eversm.*	116
Lycos dauricus, *Pall.*	117
—— neglectus, *Schleg.*	118
Corvus sinensis, *Gould*	119
—— japonensis, *Bp.*	120
—— corax, *L.*	121
—— pastinator, *Gould*	122
Nucifraga caryocatactes, *L.*	123
Turtur rupicola, *Pall.*	124
—— risoria, *L.*	125
Lagopus alpinus, *Nilss.* (*Midd.*)	126
—— albus, *Gmel.*	127
Tetrao urogallus, *L.* (*Pallas*)	128
—— urogalloides, *Midd.*	129
—— tetrix, *L.*	130
—— franklinii, *Dougl.*	131
—— bonasia, *L.*	132
Phasianus torquatus, *Gmel.*	133
Thaumalea picta, *L.*	134
Otis tarda, *L.*	135

Japan.	No.
Garrulus brandti, *Eversm.* (*Blakiston*)	121
—— japonicus, *T. & S.*	122
Lycos dauricus, *Pall.*	123
—— neglectus, *Schleg.*	124
Corvus sinensis, *Gould*	125
—— japonensis, *Bp.*	126
—— pastinator, *Gould*	127
Nucifraga caryocatactes, *L.* (*Blak.*)	128
Columba rupestris, *Pall.* (*Temm.*)	129
Turtur rupicola, *Pall.*	130
Vinago sieboldii, *T. & S.*	131
Carpophaga ianthina, *T. & S.*	132
Lagopus mutus, *L.* (*Schlegel*)	133
Tetrao bonasia, *L.* (*Blakiston*)	134
Phasianus versicolor, *T. & S.*	135
—— sömmeringii, *Temm.*	136
?? Thaumalea picta, *L.* (*Temm.*)	137
?? Perdix rubra, *Briss.* (*Temm.*)	138
Coturnix dactylisonans, var.	139

Formosa.	No.
Garrulus insularis, *Gould*	106
Corvus sinensis, *Gould*	107
Turtur rupicola, *Pall.*	108
—— chinensis, *Scop.*	109
—— humilis, *Temm.*	110
Treron formosæ, *Swinhoe*	111
Phasianus torquatus, var.	112
Euplocamus swinhoii, *Gould*	113
Bambusicola sonorivox, *Gould*	114
Coturnix dactylisonans, var.	115
Excalfactoria chinensis, *L.*	116
Turnix ocellatus, *Scop.*	117

By a comparison of these three lists, it will be seen that China, so far as it is yet explored, presents an advantage in land-birds of 115 species over Amoorland, and of 111 species over Japan. But much remains yet to be done in all three countries. The ornithology of China proper may perhaps with propriety be classed under two regions, palæarctic and semitropical,—the former comprising the country north of the Yangtsze, and the latter the land south of this river. Of the European forms of *land*-birds that range the Chinese coast, a few are identical with those of the West; but the majority have sufficiently changed in characters to be classed in some cases as varieties, in others as species. The Indian birds that occur in China are, with a very few exceptions, summer visitants. The migrations of many of the species deserve special notice. But large as my data are, as compared with former investigations, I think they are scarcely sufficient to enable me to draw statistical conclusions of any value. As I am shortly about to return to China, and hope to have further opportunities for verifying my observations, I will not now commit myself by making any general remarks which future research may compel me to retract. I therefore leave the scientific reader, after the perusal of the lists and the notes given with each species, to draw his own general inferences and come to his own conclusions.

9. Review of Prof. C. B. Adams's 'Catalogue of the Shells of Panama'*, from the Type Specimens. By Philip P. Carpenter, B.A., Ph.D.

A résumé of this important contribution to our knowledge of local faunas, and a comparison with the British Museum 'Descriptive Catalogue of the Reigen Collection of Mazatlan Mollusca,' is given in the 'Report of the British Association' for 1856, pp. 265–281. Full series of the old species, and the first specimens of the new, were deposited by Prof. Adams in the Museum of Amherst College, which also contains similar series of the Professor's Caribbean collections. The second specimens of new species were sent to Mr. Cuming, and through his kindness were freely used in preparing the Mazatlan Catalogue, thus avoiding the necessity of many synonyms. An instructive lesson in candour and forbearance may be learnt by comparing together the works of any two naturalists of equal celebrity, or by comparing either of them with the types. With the best desires for accuracy, and the greatest care, it is hardly possible for an author to describe so that his readers shall see shells as he sees them. If this be true of such full and precise diagnoses as those of Adams and Gould, how much greater must be the difficulty to foreigners of recognizing shells from the brief descriptions of Broderip, Lamarck, and the older writers generally. The careful

* Catalogue of Shells collected at Panama; with Notes on their Synonymy, Station, and Geographical Distribution: by C. B. Adams, Professor of Zoology, &c., in Amherst College, Mass. Reprinted from the 'Annals of Lyceum of Nat. Hist. N. Y.,' vol. v. New York, 1852.

preservation of types therefore, and the interchange of specimens named from types, is of the first importance to save the time and ensure the accuracy of succeeding writers. The Smithsonian Institution has fully recognized this principle by directing that the first available duplicate of all type species described from its collections shall be deposited in some museum open to students on the other side of the Atlantic.

As the authorities of Amherst College had not taken any steps to figure their unique specimens, and as Prof. Adams's determinations of old species had not been verified, I made it my business (when visiting America to deposit the first duplicate series of the Mazatlan Shells in the New York State Museum at Albany) to compare Prof. Adams's collection, on the spot, with his published book, in my copy of which I made my notes and sketches at the time. Every facility was afforded me by the Curator. I was allowed freely to handle the specimens in the presence of his assistant, and to draw the minute species under my microscope*. I took with me for comparison the drawings of the minute Mazatlan shells in the British Museum. The species being numbered in both the Panama and the Mazatlan lists, it is easy now to institute a comparison between them. They are here distinguished by the initials P. and M.

P. 1. *Ovula avena.* May be distinct from *Radius variabilis*, M. 435, being much more stumpy, with a thicker lip; but the few specimens are in poor condition, and the differences may be accidents of station.

2. *Ovula emarginata*=*Carinea e.* Quite distinct from its Caribbean analogue *C. gibbosa.*

3. *Ovula neglecta*, C. B. Ad., is probably a small variety of *Radius variabilis.*

4. *Ovula variabilis*, C. B. Ad.=*Radius v.*, M. 435.

5. *Ovula*, sp. ind., probably=*variabilis*, jun.

6. *Cypræa arabicula*=*Aricia a.*, M. 438.

7. *Cypræa cervinetta*=*C. exanthema*, M. 436. Having now examined a multitude of specimens from different stations on the west coast, which differ from each other quite as much as they do from the typical Caribbean forms, I am confirmed in the belief of their identity.

8. *Cypræa punctulata*=*Aricia p.* Erroneously given, in M. p. 374, as a probable synonym of *A. arabicula.* It is less thickened at the sides, with smaller spots. Although specimens of *arabicula* graduate into it at the back, it may always be known by the mouth, which has its teeth much further apart.

9. *Cypræa pustulata*=*Trivia p.*, M. 439.

* The week which this work occupied was spent with the widow of the late Professor, who undertakes the duty of boarding students. Her two oldest sons were, alas! among the early victims of the civil war.

10. *Cypræa radians*=*Trivia r.*, M. 440.

11. *Cypræa rubescens*=dead sp. of *Trivia sanguinea*, M. 442.

12. *Cypræa sanguinea*=*Trivia s.*, M. 442.

13. *Erato scabriuscula*. Stet.

14. *Marginella minor*. Stet, M. 587.

15. *Marginella sapotilla*. The Panama specimens collected by Prof. Adams, and abundantly by others, more closely resemble *M. prunum* than the type *M. sapotilla* of Hinds, which is a much smaller shell. The Caribbean shells (which are found across the Isthmus at Aspinwall) differ only in having a sharper angle in the labrum at the posterior notch. Adanson's habitat, doubted by Prof. Adams (note, p. 41), is confirmed by specimens in the Bristol Institution brought from Sierra Leone by Chief Justice Rankine. The Pacific shells are probably conspecific, sufficient evidence being now in our possession that the two oceans were united at least as late as the Miocene epoch*.

16. *Mitra funiculata*. Stet.

17. *Mitra lens*, M. 585.

18. *Mitra nucleola*. Closely resembling young specimens of the Caribbean *M. granulosa*.

19. *Mitra solitaria*, C. B. Ad.=*Zierliana s.* Other specimens have since been found of this characteristic species. The "transverse ribs" can scarcely be said to be "obsolete anteriorly."

20. *Mitra tristis*=*Strigatella t.*, M. 586.

21. *Terebra elata*=*Myurella e.*

22. *Terebra larvæformis*=*Myurella l.*

23, 24. Stent.

25. *Terebra tuberculosa*=*Myurella t.*

26. *Terebra varicosa*. This may possibly be a very young specimen of *Subula v.*; but I think it distinct.

27–31. Sp. ind. A specimen of *Euryta fulgurata*, M. 455, is in the museum, as from Panama, but not of Prof. Adams's collecting.

32. *Oliva angulata*, M. 590.

* The specimens in the Cumingian Museum, named *M. cærulescens* at the time of the British Association Report, are now labelled "*sapotilla*, Hds., 5–13 fathoms sandy mud, Panama, H. C." Another set of Pacific shells (notch-angle rounded) are given as "*Marginella* n. s., Panama," "San Domingo" having been erased. The large West-Indian form (notch-angle sharp) is given as "*cærulescens*, var., Lam., 10 fathoms sandy mud, Panama." Another set of large shells, with sharp angle, and labrum tinted behind, is given as "*cærulescens*, Lam., Panama," but without authority. The small West-Indian form (like the typical *sapotilla*) is given as "*glans*, Mke." Either in this, as in other instances, error has crept into the locality-marks, or else even the distinction pointed out by Mr. Redfield (who has given peculiar study to this genus) cannot be relied on for separating the species geographically.

33. *Oliva araneosa*=*O. melchersi*, M. 591. Prof. Adams's shanty specimen can scarcely be distinguished from that which he marked "*O. literata*, Alabama." But the ordinary aspect of the shells *O. reticularis* from the Caribbean Islands, *O. literata* from the coast of the Southern States, and *O. melchersi* from the Pacific, is sufficiently distinct (for the genus).

34. *Oliva inconspicua*, C. B. Ad.=*Olivella i.*, M. 599. Some of the shells referred to this species from Panama, Mazatlan, and Cape St. Lucas graduate into the Caribbean *O. oryza*; others into dwarf forms of *O. gracilis*. The species either needs revision from fresh specimens, or should be merged into *O. gracilis*.

35. *Oliva pellucida*, C. B. Ad. Dead specimen; differs from *Olivella p.*, Rve.

36. *Oliva porphyria*. Stet.

37. *Oliva semistriata*=*Olivella s.* Closely resembles *O. columellaris*.

38. *Oliva testacea*=*Agaronia t.*, M. 602.

39. *Oliva undatella*=*Olivella u.*, M. 595.

40. *Oliva venulata*. This shanty specimen is *O. angulata*, jun. The *O. venulata*, M. 593, is named by Prof. Adams *O. julietta*, as also by Mke. (non Ducl.). The true *O. julietta* (Guacomayo, Mus. Smiths.) is the Pacific "analogue" of *O. fusiformis*.

41. *Oliva volutella*=*Olivella v.* It is surprising that this species, so immensely common at Panama and up the coast, should not reach the Gulf, and that the equally common *O. tergina* of Mazatlan and *O. gracilis* of Cape St. Lucas and Acapulco should be rare elsewhere, while the larger Olives are found from Guaymas to the equator. *O. dama* (=*lineolata*, Gray, C. B. Ad.), abundant at Mazatlan, was bought, not collected, by the Professor at Panama.

42. *Planaxis planicostata*. Stet. Also immensely common at Panama, though absent from Mazatlan.

43. *Nassa canescens*, C. B. Ad. Having compared this unique specimen with P. 50, q. v., I can speak to their complete identity. The "pale grey" of the "interspaces" is due to the shell being dead.

44, 45. Stent.

46. *Nassa gemmulosa*=M. 631, exactly.

47. Stet.

48. *Nassa luteostoma*=M. 623.

49. *Nassa nodifera*. Also found at Guaymas.

50. *Nassa pagodus*, C. B. Ad. (+*N. canescens*, P. 43)=*N.* (? *pagodus*, var.) *acuta*, M. 625. It is certainly the *N. decussata* of Kien., but probably not of Lam. Whether it is the *Triton pagodus* of Rve. I am still unable to say, the type being apparently lost. We are bound to suppose that Mr. Reeve could not mistake so de-

cided a *Nassa* for a *Triton*; so that if Lamarck's is a similar Eastern species, the West American may stand as *N. acuta*.

51. *Nassa panamensis*, C. B. Ad. The Professor rightly marked his duplicates "*exilis*, Pws." This abundant shell, having a Pisanoid, not a Nassoid operculum, probably belongs to *Phos*, *Northia*, or some genus not yet eliminated. *N. obsoleta*, Say, has a similar operculum, and appears nearly related.

52. *Nassa proxima*. The unique specimen appears to be an extreme form of *N. versicolor*, P. 55.

53. *Nassa? scabriuscula*, C. B. Ad. (non Pws.)=*N. complanata*, Pws.: v. P. 56.

54. *Nassa striata*, C. B. Ad. The two type specimens, one young, the other adult, both belong to a variety of *versicolor*. The phrase, "last whorl spirally canaliculate on the left side," simply expresses the ordinary character of *Nassa*. The specimens in Mus. Cuming., however, from another source, differ somewhat in the nucleus from the small form of *N. versicolor*. These=*N. paupera*, Gld., teste Cuming, and should take that name.

55. *Nassa versicolor*, C. B. Ad., M. 632. The revolving striæ vary so greatly in this species, as well as the size, obesity, and colour, that it is hard to assign its limits. The specimens marked *versicolor* by the Professor vary much more among themselves than the extreme ones do from his *proxima* and *striata*. The apex and early whorls of each are exactly the same under the microscope. It is possible that the unique *crebristriata*, M. 633, is also an extreme variety.

56. *Nassa wilsoni* appears to be only a dwarf form of P. 53, *N. complanata*.

57. *Buccinum crassum=Phos c.*

58. *Buccinum distortum=Clavella d.*

59. *Buccinum insigne=Pisania i.*, M. 659.

60. *Buccinum lugubre*, C. B. Ad. The Professor marked this shell on his card "*Murex*??"; then "*Fusus*?"; then "*Fusus nodulosus*, Ad., n. s."; then "*Buccinum* (?) *lugubre*, Ad., n. s."; so that the old genera were sometimes as badly defined as the new ones. It may rank with *Pisania*.

61. *Buccinum pagodus=Pisania p.*

62. *Buccinum pristis=Northia serrata.*

63. *Buccinum ringens=Pisania r.*, M. 663.

64. *Buccinum sanguinolentum=Pisania s.*, M. 662.

65. *Buccinum stimpsonianum=Nassa st.*

66. *Dolium ringens=Malea r.*

67. *Monoceros brevidentatum*. This species, very common at Panama, has been transported over (not through) the Pacific, to San Francisco and Monterey: v. P. page 75.

68. *Monoceros cingulatum*=*Leucozonia c.*, M. 583.

69. *Purpura carolensis*=*P. triangularis*, M. 608.

70. *Purpura foveolata*=*Cuma costata*, M. 610, probably; but the markings have been too much obliterated to decide with confidence.

71. *Purpura kiosquiformis*=*Cuma k.*, M. 609. There are in the collection three shells, labelled by the Professor "*P. purpuroides* (*Fusus*), Orb., Panama" = *Pisania d'orbignyi*, Rve. No authority is given, and they probably came from Peru.

72. *Purpura*, sp. ind. This shell is not to be found. It has probably been put with the last, of which it is no doubt a variety: v. M. p. 482.

73. *Purpura melo*. Stet.

74. *Purpura osculans* appears to be the young of *Rhizocheilus nux*, M. 611; of which *R. distans*, Cpr., and probably *R. californicus*, A. Ad., are only varieties.

75. *Purpura tecta*=*Cuma t.*

76. *Purpura undata*=*P. biserialis*, M. 606.

77. *Columbella atramentaria*=*Anachis a.*

78. *Columbella bicanalifera*=*Strombina b.*

79. *Columbella boivinii*. This species must rank with (*Anachis* or) *Engina**, the operculum being Pisanoid.

80. *Columbella conspicua*=*Anachis c.*

81. *Columbella costellata*, C. B. Ad.=*Anachis scalarina*, Sby., M. 645; not *A. costellata*, Sby., M. 646.

82. *Columbella diminuta*=*Anachis d.*

83. *Columbella dorsata*=*Strombina d.*

84. *Columbella fluctuata*=*Anachis fl.*

85. *Columbella fulva*=*Anachis f.*, M. 648.

86. *Columbella fuscata*, M. 617. The small var. is *C. festiva*, Kien.

87. *Columbella gibberula*=*Strombina g.*

88. *Columbella gracilis*=*Anachis g.*

89. *Columbella guttata*=*Nitidella cribraria*, M. 613.

90, 91, 92. Stent.

93. *Columbella lyrata*=*Anachis l.*

94. *Columbella major*, M. 615.

95. *Columbella modesta*=*Truncaria m.* It might be convenient to leave this genus as arranged by Messrs. H. and A. Ad. Mr. Henry Adams desires to restrict it to the type species, in which

* Of the shells called by French authors *Semi-Ricinula*, those with a Purpuroid operculum may be retained as *Sistrum*, while those with Pisanoid operculum should be removed as *Engina*, with *Anachis*, to the *Muricidæ*.

case this and similar species must be moved to *Nitidella*, if the operculum be (as is presumed) Purpuroid; or to *Amycla*, if Nassoid.

96. *Columbella mœsta*=*Anachis m.*

97. *Columbella nigricans*=*Anachis n.*

98. *Columbella parva.* This appears to be only a dead specimen of *C. pygmæa*, P. 100.

99. *Columbella pulchrior* is probably a *Nitidella.*

100. *Columbella pygmæa*=*Anachis p.*, M. 651.

101. *Columbella rugosa*=*Anachis r.* This appears to be the commonest and most variable species of the genus. The typical specimens are somewhat stumpy, with stout knobs. Then the knobs pass into long, compressed ridges, and finally change into narrow bars. These are wide apart, or close, or nearly evanescent on the back. The shape passes from the stumpy to an acuminate form like *costellata.* Some adults are more than twice the size of others; but the same variations are found in both extremes. The colours are generally laid on in patches on the knobby specimens; in fine flames, on the smoother ones. In all varieties, it is known from *fluctuata* by the spiral striæ over the whole surface; and from *varia* by the shoulder, more or less developed into a keel, on the whorls of the spire.

102. *Columbella strombiformis*, M. 616.

103. *Columbella tessellata*, C. B. Ad. (non Gask.)=*Anachis guatemalensis*, Rve.

104. *Columbella turrita*=*Strombina t.*

105. *Columbella varia*=*Anachis v.*

106. *Columbella* sp. ind. is the young of a species in Mus. Cuming., resembling *harpæformis.*

107. *Ricinula carbonaria*=*Engina c.*

108. *Ricinula jugosa* may be an *Engina*, but has more the aspect of the Pacific group *Peristernia.*

109. *Ricinula reeviana*=*Engina pulchra*, Rve.

110. *Cassis abbreviata*=*Bezoardica a.* On comparing a large series of specimens from Cape St. Lucas with a similar series of *C. inflata* from Texas, I was unable to discover any specific differences. It varies greatly, from each ocean, in painting, sculpture, height of spire, &c.

111. *Cassis coarctata*=*Levenia c.*

112, 113, 114(=M. 480), 115, 116(=M. 481), 117, 118*(=M. 476), 119*(=M. 477), 120 (=M. 475), 121, 122 (=M. 381, *galeatus*), 123 (=M. 449), 124 (=M. 448), 125. Stent.

* Having now examined a large number of specimens of these two forms, I have no hesitation whatever in regarding *Conus regalitatis* as simply a variety of *C. purpurascens.* Similar differences may be observed in comparing large series of almost all Cones.

126. *Triton chemnitzii*=*Argobuccinum nodosum*, M. 580. These shells are small and turreted. Those Prof. Adams marked "*T. cingulatum*, Lam., E. Indies," are much more like the Mazatlan shells.

127. *Triton constrictus*=*Distortio c.* The specimens of this group from the Pacific Coast, from the Gulf of Mexico, and from the China Seas are very difficult to discriminate.

128. *Triton fusoides.* This unique and very elegant shell can scarcely be called a *Triton*, even of the *Epidromus* type. It may perhaps rank with *Euthria*, but is peculiar in possessing a distinct anterior sinus, near the canal, like *Rostellaria*.

129, 130, 131, 132*, 133, 134*, 135. Stent.

136. *Murex dubius*=*Muricidea dubia*, M. 673.

137. *Murex erosus*=*Muricidea e.*

138. *Murex radix*=*Phyllonotus r.* The Professor's specimens of this species are remarkably fine, more nearly resembling the Gulf *nigritus* than the heavy stumpy shells usually seen. His young specimens are heavier, but more turreted, than the young *nigritus*. The opercula appear to have fewer frills; but such differences may be due only to station. The specimens he marked *ambiguus* (without locality) belong to the typical *nigritus*. *Phyllonotus radix* and *nigritus* graduate into each other almost as freely as the latter does into *ambiguus*: v. M. 666.

139. *Murex rectirostris.* This and kindred species run into each other too closely, when adult, to speak with any confidence on so young a specimen in bad condition.

140. *Murex recurvirostris.* This specimen is also far too imperfect to affiliate: v. M. 665.

141. *Murex regius*=*Phyllonotus r.*, M. 670.

142. *Murex salebrosus*=*Vitularia s.*, M. 612. The curious group of Muricoid Purpurids culminates on the West American shores. It is represented in the north temperate regions by *Cerastoma*, on the warmer shores by *Chorus*, and in the tropical regions by *Vitularia*. The Lower Californian *Murex belcheri*, Hds., belongs to the group. Dr. Alcock (who has succeeded the late Capt. Brown as Curator of the Manchester Natural History Museum) has pointed out very well-marked physiological distinctions between the two families, which are coordinate with the differences in the opercula.

* Dr. Gray (Guide to Mollusca, pp. 39, 42) leaves the round-varied Ranellids, as *Apollon*, in the *Tritonidæ*, "operc. annular, nucleus subapical, within the apex;" but removes the sharp-varied species, as *Ranella*, to the *Cassididæ*, and figures the operculum like *Bezoardica*, "half-ovate, nucleus central, lateral, internal." The operculum of *R. cælata*, No. 132, is almost identical with *Murex*, and the shell accords with *Apollon*; but *R. nitida*, No. 134, which has very sharp varices, has its operculum widely removed from *Bezoardica*. It is closely related to that of *Cerastoma*, *Rhizocheilus*, and some of the *Œcinebræ*; nucleus near the anterior end of the labrum; labral portions of the annular layers eroded; scar as in Purpurids, with about three roughly angular ridges of growth.

143. *Murex vibex*. This Peruvian species also probably belongs to the Purpurid group.

144. *Murex vittatus*=*Muricidea v*.

145. (=M. 638), 146 (=M. 579). Stent.

147. *Fusus bellus*, C. B. Ad. This is a pretty little shell, resembling a young *Metula*, and is probably one of the species assigned with doubt to that genus, M. 619–622, or to *Fusus*, M. 642. I should erase the words, "some of which are varicoid" (referring to the radiating ribs), as my glass did not enable me to detect a single one.

148. *Fasciolaria granosa*. A minute specimen is of the size and general appearance of the fry of *Chrysodomus antiquus*, with one and a half irregular nuclear whorls. An adult has its operculum broken and mended from a subcentral nucleus—a mode of proceeding which I have now observed in such a multitude of species belonging to different families of Proboscidifers and Toxifers that I venture to assign it as the original type of their opercula, from which the special family forms are modifications of high development. Of the spiral Rostrifers there is not yet sufficient evidence to speak*.

149. *Turbinella cæstus*, M. 581.

150. *Turbinella castanea*=*Latirus c*.

151. *Turbinella cerata*=*Latirus c*., M. 582.

152. *Turbinella rudis*=*Latirus r*.

153. *Turbinella spadicea*=*Latirus s*.

154. *Cancellaria affinis*. Very closely allied to *C. urceolata*, M. 445.

155, 156, 157 (=M. 446), 158, 159. Stent.

160. *Cancellaria pygmæa* is simply a young specimen of *C. goniostoma*, no. 157.

161, 162. Stent.

163. *Pleurotoma aterrima*=*Drillia a*.

164. *Pleurotoma atrior*. This is a fine specimen, not quite mature in the lip, of *Drillia aterrima*, var. *melchersi*, M. 461.

165. *Pleurotoma bicanalifera*=*Clathurella b*.

166. *Pleurotoma collaris*=*Drillia c*.

167. *Pleurotoma concinna*=*Cithara c*.

168. *Pleurotoma corrugata*=*Drillia c*.

169. *Pleurotoma discors*=*Drillia d*. Probably a finely developed variety of *aterrima*.

* When at Charleston, S. C., I had an opportunity of examining many very fine specimens of the giant *Fasciolaria*, so seldom seen in this country, of which a broken specimen in my collection measures 20 in. In sculpture, colour, and general appearance some were so very like *F. princeps*, M. 584, that I was tempted to consider the latter a degraded local variety, till I found the operculum, which is destitute of the singular grooving of the Gulf species.

170. *Pleurotoma duplicata*=*Drillia d.*

171. *Pleurotoma excentrica*=*Drillia e.* I cannot endorse this and some other determinations of critical species of Pleurotomids, not being able to remove the specimens for comparison with types. Even the types in Mus. Cuming. do not always present satisfactory diagnostic characters.

172. *Pleurotoma exigua*=*Mangelia e.* I could not discover "the rest in pairs."

173. *Pleurotoma gemmulosa*=*Mangelia g.*

174. *Pleurotoma grandimaculata*=*Drillia g.*

175. *Pleurotoma incrassata*=*Drillia i.*, M. 459. The collection contains *D. luctuosa*, M. 467, as from Panama, but not of the Professor's collecting.

176. *Pleurotoma nigerrima*=*Drillia n.*

177. *Pleurotoma obeliscus*=*Drillia o.* Very worn and doubtful.

178. *Pleurotoma olivacea.* Closely resembles *P. funiculata*, M. 457.

179. *Pleurotoma pallida*=*Drillia p.*

180. *Pleurotoma rigida*=*Clathurella r.*

181. *Pleurotoma rudis.* It is probable that this is not the true *Drillia rudis*, being distinguished by white spots on the knobs: v. M. 460.

182. *Pleurotoma rustica*=*Drillia aterrima*, var. *melchersi*, M. 461. These specimens being very worn, their specific identity with P. 164 was not recognized by the Professor. One shell, marked "*rustica*, var.," may be the true *rustica*—a species by no means satisfactorily distinguished.

183. *Pleurotoma striosa*=*Drillia s.*

184. *Pleurotoma zonulata*=*Drillia z.*, M. 463.

185. *Pleurotoma*, sp. *a.* A small, dark, purple-brown *Mangelia*, of the *leufroyi* type.

186. *Pleurotoma*, sp. *b.* A slender, pure-white, ribbed shell; probably a *Cithara.*

187. *Mangelia*, sp. *c.* A young *Daphnella.*

188. *Mangelia*, sp. *d.* A very worn, black shell; with white, knobby ribs.

189. *Mangelia*, sp. *e.* A very small, white shell; resembling a young *Bela turricula.*

190. *Mangelia*, sp. *f.* A very small, white *Drillia*, with distinct posterior notch; spirally striated, with rather sharp ribs.

191. *Mangelia neglecta.* Of the "elevated spiral line on the middle of the whorls" I could discover no trace, except of colour. It is therefore probable that it=*M. acuticostata*, M. 473.

192. *Mangelia sulcosa* is the true *Columbella s.* of Sby.

193. *Cerithium adustum*=*C. maculosum*, M. 381.

194. *Cerithium assimilatum*=*Cerithiopsis a.*, M. 563.

195. *Cerithium bimarginatum*=*Cerithiopsis b.* A good species; but I could not detect the "intermediate raised line." The apical whorls are almost smooth. The "prominent spiral fold" on the columella is simply that which bounds the recurved canal.

196. *Cerithium famelicum.* Confusion has arisen from the Professor having sent to Mr. Cuming as his type a shell which does not answer to the diagnosis, and which is described as (? var.) *mediolæve*, M. 382. Ten specimens are retained in the Amherst Museum, of which eight are of the *uncinatum* type, =M. 383, and two of the Cumingian. *C. uncinatum*, being an old species, is probably from the Atlantic or E. Indies: if this should prove identical, the name *famelicum* must be dropped; if distinct, retained for the west coast uncinoids, according to the diagnosis. After an examination of a large series of specimens collected by Mr. Xantus at Cape St. Lucas, I am confirmed in the belief that the Cumingian shell is a distinct species, which must stand as *C. mediolæve.*

197. *Cerithium gemmatum*=*Rhinoclavis gemmatus*, M. 389. So much confusion has arisen from raising specific names to the generic peerage, that whenever a good distinct name has been given, it appears best to retain it—the unbending rule of mere priority for work which is sometimes slovenly, and therefore best forgotten, notwithstanding.

198. *Cerithium ? interruptum*, C. B. Ad. (non Mke.=M. 388). Great confusion has arisen from this erroneous determination, as may be seen by comparing the Maz. Cat. *in loco* with the monograph of Sowerby, jun., who has redescribed the southern, highly sculptured forms of the true *interruptum* as *C. galapaginis.*

198 and 199 are regarded by Messrs. Cuming and Sowerby as varieties of

200. *Cerithium irroratum*, C. B. Ad. (Gld. ipse et MSS., non Gld. in Expl. Exp.)=*C. stercusmuscarum*, M. 387. The aspect of the Panama shells is so different from that of the Mazatlan specimens that I did not wonder at Dr. Gould's opinion that they were distinct. He was, however, misled in affiliating the former to his *C. irroratum*, of which I fortunately discovered the figured type in the Smithsonian Institution, and which proves to be (according to Mr. Cuming) the *C. obesum* of Sby. sen., from the Philippines. It is fortunate therefore that the name may be entirely dropped. Some of the specimens of no. 198 graduate sufficiently closely to the Mazatlan form; those of no. 199 are intermediate; while those of no. 200 present a stronger but smaller shell, well armed with small nodules, which are not to be seen in the fine Gulf specimens.

201. *Cerithium neglectum*=*Cerithiopsis n.*

202. *Cerithium pacificum.* Stet.

203. *Cerithium pauperculum* is a good, new species of *Chrysallida*. The Professor probably did not recognize the Chemnitzoid apex and the Odostomoid plait. The following alterations may be made in the diagnosis:—Shell pale orange [not horn], with six [not five] keels on the spire; spiral ridges anteriorly fainter [not obsolete]; apex sinistral [not acute], of three Paludinoid whorls, the last large in proportion; columella effuse [not canaliculated], with a long, slender, slanting plait.

204. *Cerithium pulchrum*=*Cerithidea p.* A distinct and truly beautiful species, seldom obtained by collectors.

205. *Cerithium reevianum*=*Cerithidea montagnei*, M. 394.

206. *Cerithium validum*=*Cerithidea varicosa*, M. 395. The Southern shells, in all their changes, present such a different aspect from the Gulf specimens, that I am inclined to regard the form *Mazatlanica* as distinct, of which *C. albonodosa* may prove a variety.

207. *Triphoris alternatus*, M. 391.

208. *Triphoris inconspicuus* is scarcely even a variety of the last; and does not differ so much as the specimens described under the same name, M. 392.

209. *Triphoris infrequens* is not the shell described, under the same name, M. 393, but is the *Cerithiopsis tuberculoides*, M. 557. It would have been strange if I had recognized the shell from the diagnosis; for *both of the specimens are dextral*. The apex is nearly smooth. I forbear to redescribe nos. 392, 393 of the Maz. Cat., as they were separated principally in deference to Prof. Adams's authority, until more numerous specimens should have been examined.

210. *Turritella banksii*=*T. goniostoma*, jun., M. 379.

211. *Cæcum diminutum*=*Cæcum firmatum*, jun., with numerous close rings. All the Professor's specimens of this genus were dead; most of them pierced by Proboscidifers. They fully confirmed the judgments I ventured to form of them in the Maz. Cat. and in the "Monograph of the Cæcidæ," P. Z. S. 1858, p. 413 *et seq.*

212. *Cæcum eburneum*=*C. firmatum*. The rings vary from twenty-six to thirty-three.

213. *Cæcum firmatum*, M. 368. Add to the diagnosis in Maz. Cat. p. 320, last line, "*operculo vix concavo, suturis minus definitis.*"

214. *Cæcum læve*. The two specimens are too worn for identification, but will pass sufficiently for the species described under the same name, M. 372.

215. *Cæcum laqueatum*. A good species of the *Elephantulum* group: v. Maz. Cat. p. 315, and P. Z. S. *loc. cit.* p. 420.

216. *Cæcum monstrosum*=*C. firmatum* in the adolescent stage.

217. *Cæcum parvum* turns out, as was expected, to be=*C. undatum*, M. 371. The unique specimen is stunted and dead.

218. *Cæcum pygmæum* is a small but nearly adult *C. firmatum*.

219. *Chemnitzia aculeus*, M. 521.

220. *Chemnitzia acuminata* is a true *Chemnitzia*, and not a *Chrysallida*, as supposed in the Br. Assoc. Report, p. 334. The name misleads, as it is a peculiarly broad species. The vertex consists of three Paludinoid whorls, of which the apex is visible, projecting a little beyond the spire. The ribs, instead of "terminating abruptly on the periphery of the last whorl," become gradually evanescent round the base *.

221. *Chemnitzia affinis*. Comp. M. 523, which was identified from Mr. Cuming's specimen. The diagnosis needs the following corrections from the type. The "ribs terminate" not very "abruptly at the periphery." Anteriorly very finely striated [not "smooth"]. "Last whorl" not "angular at the periphery." Base prolonged. It is probably the adult form of my *Chemnitzia undata*, M. 531, the characteristic fine, waved, spiral striæ having escaped the Professor's notice. The only difference is that the ribs evanesce more suddenly in the Panama than in the Mazatlan shell, which may be due simply to age.

222. *Chemnitzia clathratula*, part. = *Chrysallida clathratula*, M. 513, which was identified from the Cumingian specimen. The specimens preserved as types contain, along with this species, one of *Chrysallida communis*, one (almost certainly) of *Chrysallida effusa*, M. 510, and one of *Dunkeria subangulata*, M. 537. Some parts of the description appear taken from the latter species: *e. g.* the "five or six" spiral lines, of which there are only four in the *Chrysallida*; and the angle on the "upper part" of the whorls, which in the latter are well rounded.

223. *Chemnitzia communis*, M. 507. This is the type of the genus *Chrysallida*: v. M. pp. 416, 420. Prof. Adams's tray contains also one specimen of *Chrysallida effusa*, M. 510; one of *Chrys. telescopium*, M. 508; one of *Dunkeria subangulata*, M. 537; and one which may be a variety of the latter, or a distinct species.

224. *Chemnitzia gracilior*. The "well-impressed spiral line" is only seen in some of the whorls.

225. *Chemnitzia major* belongs to the section *Dunkeria*. I counted eighteen (not twenty-four) ribs.

226. *Chemnitzia marginata* is a good species of *Chrysallida*; but I could not find the "spiral, compressed ridge."

227. *Chemnitzia panamensis*, M. 518. I counted twenty-four (not twenty-seven) ribs. The tray also contains one specimen of

* As several errors are here pointed out in the diagnoses of small shells, it is right to state that Prof. Adams had not the advantage of a microscope during a considerable portion of the work; nor was the instrument a good one when obtained. Moreover the incessant demands on his attention as Professor of Astronomy and Mathematics, as well as of Natural History, and his duties as State Geologist of Vermont, did not leave him much time for original research. What he accomplished during his short life is marvellous. Had that life been spared to revise his works, the necessity for this friendly criticism would not have arisen.

Ch. C-B-Adamsii, M. 519, with straight ribs; and one with spiral sculpture, which may belong to *Ch. gracillima*, M. 530, but wants the produced apex.

228. *Chemnitzia similis*. This species most nearly resembles *aculeus*, but is broader, larger, and with more ribs, of which I counted from twenty to twenty-two (not twenty-six). I should not call the whorls "convex." They are, however, more rounded, and the base is more produced, than in the shell called "? *similis*," M. 520, which is perhaps a variety of *panamensis*.

229. *Chemnitzia striosa*. The early whorls are very slender. The spiral striæ are on the tops of the ribs, of which I counted from twenty-four to thirty-two (instead of "about forty").

230. *Chemnitzia turrita*. This species includes the "*Rissoa*, sp. ind." no. 251.

231. ? *Littorina angiostoma* is a *Fossarus*.

232. *Littorina aspera*, M. 397. The Mazatlan periwinkles, being in good condition, divide themselves very naturally into three species. The Panama specimens, being generally eroded, are not so easily dealt with. Of Prof. Adams's specimens here retained, the majority belong to *aspera*, although several of the smaller ones are *philippii*, M. 398. The young appear to be of both species mixed. The "variety" consists of the abnormal tall specimens of *conspersa*, M. 396, with a few very large *philippii* intermixed.

233. *Littorina atrata*. This abundant little shell is a *Fossarus*, of which the Professor's ?*Adeorbis abjecta*, no. 257, is a more advanced form. It is possible that one of the *Fossari* described in Maz. Cat., nos. 404, 405, may be conspecific; but among the multitude of specimens I could not find one with the nuclear whorls sufficiently perfect to decide. The shells vary extremely in shape and sculpture.

234. *Littorina conspersa*, M. 396. Smaller and generally more stumpy than the Mazatlan shells, but containing a few specimens of the same extreme forms.

235. ? *Littorina excavata*=*Fossarus e*.

236. *Littorina fasciata*, M. 400. The specimens of this species and of *L. varia* graduate rather closely towards each other.

237. ? *Littorina foveata*. A good species of *Fossarus*. Read, "Last whorl angular" at the umbilicus [not "below the middle"].

238. ? *Littorina megasoma*. This is also a good species of *Fossarus*. The Professor was doubtful whether to refer these forms to *Littorina* or to *Narica*.

239. *Littorina* ? *parvula*, C. B. Ad. This is not Philippi's *L. parvula*, but is a dwarf form of the *L. philippii*, M. 398. The Professor suggests the name *L. dubiosa* for this sufficiently well-marked species; but as he catalogued and distributed his specimens under ? *parvula*, and kept others under *aspera*, it may be best to retain

the name *philippii* under which it has been very extensively circulated.

240. *Littorina pulchra*. A very rare species, belonging (with *fasciata* and *varia*) to the *Melaraphe* group.

241. *Littorina puncticulata*. This is the normal state of *L. conspersa*: v. M. 396.

242. *Littorina varia*: v. note on P. 236.

243. *Rissoa clandestina*. Three specimens appear of this species of *Rissoina*, closely resembling *R. woodwardii*, M. 410, but with more ribs, and not displaying the intercostal striulæ.

244. *Rissoa firmata*. Another species of *Rissoina*, resembling *R. stricta*, M. 408, but smaller. The Professor did not observe the fine spiral sculpture, as described in no. 250; q. v.

245. *Rissoa fortis*. A good species of *Rissoina*, differing from *R. janus* in the absence of spiral punctures.

246. ? *Rissoa inconspicua*, C. B. Ad., non Alder. The name being preoccupied, it is fortunate that the unique shell proves identical with *Alvania tumida*, M. 414. I found twenty (not "twelve or fourteen") ridges, which are not "obsolete," but become fainter anteriorly. The two upper whorls are very finely cancellated.

247. *Rissoa infrequens*. The unique specimen of this *Rissoina* is too much worn for description. It has more than the sixteen ribs; and the diagnostic marks must be received with caution.

248. *Rissoa janus*. The description of this *Rissoina* is drawn from a very small, dead, broken specimen, from which the sculpture is almost entirely worn away. The "var. *a*" should be considered as the type, being in perfect condition, and the diagnosis be altered as follows:—The "fine crowded spiral striæ" are seen all over, as are also the "ribs," which on each whorl "appear as striæ," and are not "obsolete near the periphery." The diagnostic character is that the spiral striæ are composed of rows of minute dots.

249. *Rissoa notabilis*. After drawing this unique shell carefully under the microscope, and making copious notes on the diagnosis from the specimen, an untoward cough lodged it among the meshes of the Curator's carpet, whence I endeavoured in vain to extricate it. This unfortunate accident is, however, the less to be regretted, as I can state with perfect confidence that it was exactly identical with another shell in the collection, P. 255, q. v.; and with M. 498, *Parthenia quinquecincta*. The "concave summits" of the ribs imply that the ribs are sharp, with concave interstices; and the "upper keel" is simply due to the angulation of the whorls. Though the lip was broken, the columellar plait, as well as the sinistral apex, escaped the Professor's notice.

250. *Rissoa scalariformis*. This unique specimen is simply the young of *Rissoina firmata*, P. 244; and probably = *Rissoina*, sp. ind., M. 409.

251. *Rissoa*, sp. ind. This is a broken specimen of *Chemnitzia turrita*, P. 230.

252. ? *Cingula inconspicua*. This unfortunate name, liable to be confounded with *Rissoa inconspicua*, Alder, and ? *Rissoa inconspicua*, C. B. Ad., will not be needed, as the type belongs to another suborder, and = *Chrysallida ovulum*, M. 512. The Professor did not observe its close relationship with his *Chemnitzia communis*.

253. *Cingula paupercula*, C. B. Ad. A good species.

254. ? *Cingula terebellum* = *Parthenia exarata*, M. 501. Although I took every pains, in preparing the Maz. Cat., to identify Prof. Adams's species, I was not prepared, in the writings of so careful a naturalist who had devoted special attention to the minute species, to find a Pyramidellid under Trochidæ, especially with the mark "apex subacute." The finding of a more perfect Mazatlan specimen enables me to add to the diagnosis:—"*vertice nucleoso parvo, satis extante, decliviter sito; interstitiis carinarum transversim rugulosis; labro solidiore*. Long. ·087, long. spir. ·057, lat. ·038."

255. ? *Cingula turrita* (+P. 249, *Rissoa notabilis*) = *Parthenia quinquecincta*, M. 498. When a shell is described under two genera in the same sheet, the advocates of unbending priority will find it difficult to decide. As each name belongs to a widely removed family, that last given is at least the most correct and distinctive.

256. ? *Litiopa saxicola*. The Professor states that this "shell has the appearance of a *Litiopa*;" but it wants both the peculiar nucleus and the semitruncated columella; also that the "labium has a distinct deposit," of which I could not see any trace in either of the specimens. It is probably a *Cingula*.

257. ? *Adeorbis abjecta*. This is the adult form of the shell, of which P. 233, *Littorina atrata*, is the young. The striæ are seen on the lower as well as the "upper part of the whorls." The umbilicus, though "small" for an *Adeorbis*, is rather large for a *Fossarus*, to which genus the species undoubtedly belongs.

258. *Vitrinella concinna*. I could not find the "more or less distinct ridge between the first two keels."

259. *Vitrinella exigua* = M. 305. The omissions in the Professor's diagnoses of this and other species, being supplied in the Maz. Cat., need not be repeated here: v. M. pp. 236–247.

260. *Vitrinella janus*. The Professor does not mention the fifth keel, which bounds the umbilicus, and within which are the "minute spiral striæ." The "transverse striæ" are strong between keels 2, 3, and 4; faint between 4 and 5, and between 1 and 2; and evanescent near the suture.

261. *Vitrinella minuta*. The original type of this species accords better with *Ethalia* than with *Teinostoma*, to which I had referred the Cumingian type.

262. *Vitrinella modesta*. The "modesty" of this unique shell is

coordinate with considerable attrition, and an umbilicus filled with dirt. It appeared to me regularly rounded, without any keel. The "few spiral striæ" are probably the remains of what once covered the whole surface.

263. *Vitrinella panamensis*=M. 295.

264. *Vitrinella parva*=M. 296.

265. *Vitrinella perparva*=M. 304. The coronation of the upper keel is seen (though not described) in the type specimen.

266. *Vitrinella regularis*. The unique shell can hardly be called "subdiscoidal," since the "spire is convex, moderately elevated." I could not find the "impressed spiral line." It belongs to *Ethalia*.

267. *Vitrinella seminuda*. The unique type of this species also is much worn. I could not discover the "minute striæ of growth." Beneath, there are five spiral liræ, and a few spiral striæ near the mouth. The umbilical region and the base have fine radiating distant striæ. It comes nearest to *V. carinulata*, M. 309, but is distinct.

268. *Vitrinella tricarinata*. This unique type is also worn. The spiral keels are scarcely "prominent," that on the periphery being decidedly faint. The "transverse striæ" are between the suture and the nearest rib. The umbilical striæ are very faint.

269. *Vitrinella valvatoides*. This species probably belongs to *Ethalia*. Beside the keels, there are three obsolete spiral liræ—two on the base, and one above the periphery. The umbilicus is bounded by a long, thin callosity, which gives a character to the shell intermediate between the two genera.

270. *Solarium*, sp. ind. *a*. Of the form represented by this species and the next I have been able to examine a large number of specimens collected at Cape St. Lucas by Mr. Xantus, and in the Gulf of Mexico. I know of no mark by which to distinguish the shells from the two oceans. From each locality they vary greatly in the size of the umbilicus, and in the strength of sculpture, number of knobs, &c. I should consider them all as varieties of *S. granulatum*, Lam. *S. quadriceps*, Hds., appears distinct, though it may only be an extreme variety.

271. *Solarium*, sp. ind. *b*. This contains the specimens with coarser sculpture than the last.

272. *Solarium*, sp. ind. *c*. This is a distinct species of *Torinia*, having the size and general aspect of *Helix rotundata*.

273. *Trochus catenulatus*=*Modulus c.*, M. 401.

274. *Trochus coronulatus*=*Omphalius c.* This species reappears at Cape St. Lucas, and is closely allied to *O. ligulatus*, M. 293.

275. *Trochus leanus*=*Calliostoma l.* This distinctive generic name is strongly to be preferred to the specific *Ziziphinus*.

276. *Trochus lima*. This shell exactly accords with *Calliostoma antonii*, Koch, in Mus. Cuming.

277. *Trochus lividus*=*Modulus disculus*, M. 403.

278. *Trochus panamensis*=*Omphalius p.* A good species, though apparently very rare; for I had the pleasure of adding it to the Cumingian collection.

279. *Trochus pellis-serpentis*=*Tegula p.*

280. *Trochus reticulatus*=*Omphalius viridulus*, M. 292. This is the common Trochid of the Panama region, as is *ligulatus* of the Mazatlan.

281. *Turbo buschii*=*Uvanilla inermis*, M. 287. This shell appears to replace *U. olivacea* in the southern fauna. Besides the differences indicated in Maz. Cat. p. 229, the operculum is quite distinct.

282. ? *Turbo phasianella*=*Collonia ph.*: not (*Melaraphe*) *phasianella*, Phil.

283. *Turbo rutilus*. The unique type is in miserable condition, to which the "bright red with pale streaks" is owing. The shell may possibly have been originally a *Pomaulax undosus*, which is truly a Lower Californian species. It appears, however, to be a favourite with sailors, as specimens are continually appearing, not only high and low on the West Coast, but also from the Pacific Islands. The specimens brought by Comm. Wilkes's U.S. Expl. Exp. were obtained in N. S. Wales! Prof. Adams's fragments were probably due to ballast.

284. *Turbo saxosus*=*Callopoma saxosum*. This replaces the *C. fluctuosum* of the Gulf, M. 282, and the *C. tessellatum* of Lower California. The "var. *depressum*" of P. Z. S., 1855, I believe to be really a *Senectus* from the Pacific Islands.

285. *Scalaria hexagona*, C. B. Ad.: non Sby., M. 564. The Professor's shell is (I think) one of the species I described in P. Z. S. from Mr. Bridges's collection; but the distinctions in this genus are too critical to decide without comparison of types. This shell is broad; whorls very separate; varices long and sharp; spirally finely striated.

286. *Scalaria obtusa*, C. B. Ad.; ? non Sby. This also appeared to me one of Mr. Bridges's species. It is a very pretty shell, with close, sharp, coronated varices.

287. *Scalaria*, sp. ind. *a*. Like the next, but larger, and with spiral striæ between the extremely crowded, sharp varices.

288. *Scalaria*, sp. ind. *b*. Of the *Clathratula* type, without spiral sculpture.

289. *Scalaria*, sp. ind. *c*, is probably the young of *Cirsotrema funiculatum*, M. 569, which, with its congeners, may be removed to *Opalia*.

290. *Eulima iota*. This shell, which is a *Leiostraca* (not "? *Stylifer*"), is probably distinct from the Mazatlan form, M. 555, which should stand as *L. retexta*.

291. *Eulima recta.* The type is a very good species of *Leiostraca*; but I doubt its identity with the Cumingian specimen, with which the Mazatlan shell, M. 550, was compared. It most resembles the *L. linearis*, M. 554, with which it agrees in divergence and general shape; but that is very much smaller, with the upper whorls more tumid. In the Professor's type of *L. recta*, I searched in vain for traces of the "two brown spots." They were probably thrown by defective light. The "two opaque spiral bands" are simply the effect of the suture, and the previous whorl showing through. For the Mazatlan shell, M. 550, I propose the name of *L. involuta*.

292. *Eulima solitaria.* This also is a *Leiostraca*, not "? *Stylifer*," and accords exactly with the *Leiostraca*, sp. ind. *a*, M. 552, but not with the supposed *L. solitaria*, M. 551. The latter agrees in shape with the unique Panama shell, whorl for whorl; but its base and labrum are much more produced anteriorly. For this reason, it may be known as *L. producta*.

293. *Pyramidella*, sp. ind. This is probably the *Obeliscus* described in Maz. Cat. no. 486.

294. *Pyramidella conica* = *Obeliscus conicus*, C. B. Ad., not M. 486.

295. *Natica chemnitzii*=*N. maroccana*, M. 570. The Professor first labelled these shells "*N.* ? *maroccana*, Chem.," but crossed it off in pencil. Another tray appeared (without number) labelled "? *unifasciata*, Lam." They all belong to the large West Coast form of *maroccana*. [N.B. The shells described in P. Z. S. as "var. *californica*," on the authority of the late Mr. Nuttall, are (with others from the same source) undoubtedly from the Sandwich Islands. The Pacific specimens (of which I have examined many thousands, brought by Comm. Wilkes's E. E.) present a very different type from those of the west coasts of Africa and America; but are regarded by Mr. Cuming as only a local variety.]

296. *Natica ? lurida.* These shells are simply a pale variety of *N. maroccana*.

297. *Natica otis*, C. B. Ad. (not Brod. & Sby.). These shells appear to be the young of *Polinices "salangonensis,"* P. 298.

298. *Natica ? salangonensis.* I had no opportunity of comparing this *Polinices* with the species of Récluz.

299. *Natica souleyetiana.* The shells closely resemble *N. maroccana*, but with a larger umbilicus.

300. *Natica ? virginea*, C. B. Ad. (not Récl.) = *Polinices uber*, M. 576.

301. *Natica*, sp. ind. *a*. There is no ticket answering to this number, which was probably intended for the *N. maroccana*, var. "*unifasciata*."

302. *Natica*, sp. ind. *b*. The shells are marked *e*, and are the young of *Polinices uber*, P. 300, M. 576.

303. *Natica*, sp. ind. *c*. The shell is marked *f*, and is probably =*N. haneti*.

304. *Nerita scabricosta*=M. 326. After examining a multitude of specimens from different parts of the coast, I have not the slightest doubt of the identity of the forms called *ornata* and *deshayesii*.

305. *Nerita*, sp. ind. *a*=*N. bernhardi*, M. 327.

306. *Neritina guayaquilensis*. Stet.+*N. intermedia*, Sby.

307. *Neritina picta*=M. 329.

308–316. Stent. The shells described as "*Auricula*" belong to *Melampus*.

317. *Truncatella bairdiana*. A good species.

318. ?? *Truncatella dubiosa*. This belongs to *Hydrobia* or some similar Rissoid.

319. *Bulla* (*Tornatina*) *infrequens*=*Tornatina i.*, M. 222.

320. *Bulla* (*Cylichna*) *luticola*=*Cylichna l.*, M. 221. The Mazatlan shell is much more constricted than most of Prof. Adams's specimens.

321. *Bulla punctulata*=*B. adamsi*, M. 224. The *B. punctata*, A. Ad.=*B. punctulata*, A. Ad., but is not the *B. punctulata*, C. B. Ad.=*B. puncticulata*, C. B. Ad., MS. on ticket.

322. *Bulla*, sp. ind.=*Tornatina carinata*, M. 223.

323. *Vermetus ? glomeratus*, C. B. Ad. (not *Bivonia glomerata*, Lam.)=*V. eburneus*, M. 354. The shells sometimes assume a rufous tint in the later whorls, in which state (if the Turritelloid apex be concealed) it is liable to be confounded with *Aletes centiquadrus*. Some of the Professor's shells belong to the latter species.

324. *Vermetus panamensis*, C. B. Ad. (? Rouss.)=*Aletes centiquadrus*, M. 352.

325. *Stomatella inflata* is a *Lamellaria* with broken lip and very much curved columella: v. M. 577. [A *Sigaretus*, with somewhat sharper columella than the ordinary W. Indian form, was found among the Professor's duplicate Panama shells; but as it does not occur either in the catalogue or the collection, it was probably dropped in from the Jamaica series.]

326. *Hipponyx*, sp. ind. Of the Professor's "two small specimens" marked "*subrufa*, jun.," one is *H. grayanus*, jun., M. 350. The other may be the same, but is probably the young of *H. barbatus*. Neither are sufficiently perfect to determine with confidence.

327. *Hipponyx ? barbata*. Part of these specimens belong to *H. barbatus*, M. 349; part to *H. grayanus*; part are too much worn to determine; and one is a valve of *Discina cumingii*.

328. *Hipponyx panamensis*=*H. antiquatus*, M. 347. The species is very widely diffused, and varies greatly in each locality.

329. *Hipponyx radiata*=*H. grayanus*, M. 350. The collection

also contains a tray labelled "Panama: C. B. Ad. don.," in which are *Hipponyx serratus*, M. 346, *H. barbatus*, and *Gadinia pentagoniostoma*, M. 270. This last name should be dropped, except as a variety of *G. stellata*, Sby., which is the normal state: v. B. A. Rep. 1857, pl. 7. f. 3, *a–g*.

330. *Calyptræa aberrans*. The Professor candidly allows that "in texture this shell much resembles a valve of an *Anomia*," which it undoubtedly is, the supposed "probably imperfect cup" being the ligamental pit. The large muscular scar is very clearly developed; but the others are faint, as is customary in young shells, and might stand for either *Anomia* or *Placunanomia*. The valve is thin and glossy inside. The outside is smooth, excepting the lines of growth, and is encrusted with beautiful zoophytes. A tiny *Serpula*, which has coiled itself close to the umbo, carries out the idea of a Calyptræid spiral apex; but a careful microscopic examination displayed the true Anomoid nucleus, at a little distance from the margin, as is common in the Mazatlan specimens of *A. lampe*, M. 219.

331. *Calyptræa* (*Syphopatella*) *aspersa*=*Galerus conicus*, very worn and young, with the lamina broken away. One of the specimens may perhaps be *mamillaris*.

332. *Calyptræa cepacea*=M. 345.

333. *Calyptræa conica*. These are dead specimens, of which a few may be the true *Galerus conicus*, M. 332. But most of them belong to the brown-tinted variety of (the Professor's *G. regularis*=) *mamillaris*: v. no. 340.

334. *Calyptræa dentata*=*Crucibulum imbricatum*, M. 343.

335. *Calyptræa hispida*=*Crucibulum spinosum*, M. 344.

336. *Calyptræa imbricata*. The two specimens are too much worn to affiliate with confidence, the cups being broken out. The outside is ribbed, with arrow-headed striæ between the ribs. They probably =*Crucibulum i.*, var.

337. *Calyptræa maculata*=*Crucibulum spinosum*, M. 344. See the attempt to unravel the confusion in the synonymy of this family in Maz. Cat. pp. 264–295. Three specimens marked by the Professor "*C. maculata*, var.," are young, dead *radiata*, no. 339.

338. *Calyptræa planulata*. This unique shell is simply a young, flat *C. cepacea*, with the cup prominent, and the outside sculpture faintly developed, from living in a hollow place. The striæ are not "obsolete around the apex."

339. *Calyptræa radiata*=*Crucibulum r.* This rare and beautiful species is quite distinct, even in the early stages, from all varieties of *C. spinosum*.

340. *Calyptræa* (*Syphopatella*) *regularis*=*Galerus mamillaris*, M. 333.

341. *Calyptræa umbrella*=*Crucibulum u.* (=*C. rudis*, Brod.).

342. *Calyptræa ?unguis*, C. B. Ad.=*Crucibulum spinosum*, jun. (not *Galerus unguis*, Brod.).

343. *Crepidula cerithiicola*. Most of the specimens are the young of *C. onyx*, M. 340; but a few are of *C. incurva*, M. 339.

344. *Crepidula echinus*=*C. aculeata*, M. 334.

345. *Crepidula excavata*, M. 337.

346. *Crepidula ? hepatica*=*C. onyx*, M. 340.

347. *Crepidula incurva*, M. 339. A very interesting series of specimens; of which two or three are probably the twisted form of *C. onyx*. One tray contains specimens adhering to other shells. One, fixed diagonally on a *Calliostoma*, takes exactly the arrow-headed sculpture of the var. *Cal. imbricata*, Brod. Another, grown diagonally on *Pisania gemmata*, has the general aspect of a *Chiton*. One, fixed on the back of its neighbour which has grown on a *Calliostoma*, has the granular interruptions of the ribs transmitted *through* the first specimen. The same is true of one which has grown on another which was planted on a *Pisania*. One specimen, which had established itself on a *Calliostoma*, and began with normal ribs, is losing these at the margin, adopting the sculpture of the Trochid. An extremely twisted specimen in the tray of separate shells has a bifid deck. A young one had edged itself into the apical part of the deck, as into a maternal pouch; so the old one made a fresh deck over it.

348. *Crepidula lessonii*. Most of the specimens are of *C. nivea*, var., M. 341. Two shells, which have the apex perfect, display the characteristic nuclear riblets. One dark-coloured specimen may be a hybrid, and another (though too much worn for confident affiliation) appears to be *C. unguiformis*. Among the duplicates, all the specimens which were perfect at the apex presented the niveoid nucleus, though white; but generally the riblets were more or less worn off.

349. *Crepidula squama*. These are the flat form (mostly dead and worn) of *C. nivea*, M. 341. Some of them pass into *lessonii*. Some are highly coloured, and may be the young of *C. onyx*; one even of *C. incurva*. One of the young shells in phial appears to be *C. onyx*; but whenever the apex is perfect, it presents the typical riblets: v. Maz. Cat. *in loco*.

350. *Crepidula unguiformis*. The apex being hidden in dead shells, which I was not at liberty to break away, I could only examine one specimen, which appeared to be a *C. nivea*, var., as supposed in Maz. Cat. p. 285. Of the loose specimens, scarcely any are sufficiently perfect at the apex to speak with confidence. Most of them, however, have the characteristic painting of the variety *squama*; and all may belong to the common species (*C. nivea*), except one which is a true *C. unguiformis*, M. 342, on the back of another shell, and a few which are probably *C. onyx*, var. Of the duplicates, which I was at liberty to extract from the dead shells,

some are undoubtedly *C. nivea*; others truly *C. unguiformis*; and others probably *C. nivea*, but with the riblets worn away by the crabs.

351. *Crepidula nivea*, M. 341. The specimens are small and poor; mostly rough, of the variety *striolata* passing into *lessonii*. Wherever the apex is perfect, it presents the characteristic riblets, but is generally white, not brown as in most of the finely grown Mazatlan shells.

352. *Crepidula osculans*. This is a perfect and extremely beautiful specimen of *Scutellina navicelloides*, M. 269. The Professor did not observe the non-spiral patelloid apex, and regarded the "navicelloid" columella as an extremely narrow deck. To the diagnosis in the Maz. Cat. may now be added "*apice obtuso, sublævi; vertice haud spirali, vix conspicuo.*"

353. *Crepidula rostrata*=*C. adunca*, M. 338, ?non Sby. The examination of a large series of specimens from the temperate fauna has led me unexpectedly to confirm Mr. Reeve's opinion that they are distinct. The northern shell is *C. adunca*, Sby. (=*Garnotia* [Gray] *solida*, Hds.=*C. rostriformis*, Gld.); and the tropical shell must take the prior name, *C. uncata*, Mke. (=*C. rostrata*, C. B. Ad., Rve.=*C. adunca*, Maz. Cat., non Sby.).

354. *Fissurella æqualis*=*Fissurellidæa æ.*

355. *Fissurella alta*=*Glyphis alta*, M. 280.

356. *Fissurella macrotrema*. Stet.

357. *Fissurella microtrema*. These are dead specimens, of which some are *F. rugosa*, var., M. 273.

358. *Fissurella mus*=*Glyphis inæqualis*, var., M. 279. These shells are intermediate between the typical form and *pica*.

359, 360. Stent.

361. *Fissurella virescens*. It is doubtful whether any of the specimens are of the true *virescens*, M. 271, as they run into *nigropunctata* by insensible gradations. Perhaps both species may prove identical.

362. *Siphonaria characteristica*=*S. gigas*, var.

363, 364, 365. Stent.

366. *Siphonaria ? pica*. These are young dead limpets (not *Siphonariæ*).

367. *Lottia ? patina*, C. B. Ad. (non Esch.). These shells differ from *Acmæa mesoleuca*, M. 263, in being black instead of green, and are prettily striped.

368, 369, 370. *Lottia*, sp. ind. There may be two or even more species of *Acmæa*, but it is not impossible that there is only one among the Professor's *Lottiæ*, some of the specimens being the young of ?*Patella*, no. 371.

371. ? *Patella*, sp. ind. This has the general appearance of *P. vulgata*, but may be an *Acmæa*.

372. *Chiton clathratus*. (Genus indet.)

373. *Chiton dispar*, C. B. Ad.; not *Lophyrus dispar*, Sby. I doubt whether any of the Professor's specimens belong to Sowerby's species, which is black mixed with grey; area-sculpture very faint; and sides imbricated, not rugulose. Among the duplicates were two (if not three) species:—the principal one with side-sculpture in lobated knobs, which may be named *Lophyrus adamsii*; a ?variety with simple knobs; and a well-marked species without distinct side areas, which may be called *Lophyrus tenuisculptus*.

374. *Chiton ?luridus*. Probably correct.

375. *Chiton pulchellus*=*Callochiton p.*+*C. elenensis*.

376. *Chiton stokesii*=*Lophyrus s.*

377. *Anomia lampe*, C. B. Ad. It is doubtful whether this is identical with the northern species, M. 219.

378. *Anomia tenuis*. This is probably the young of the last species, and may give it a name, if new. It is doubtful how the diagnosis of the scars was made out; as they were not visible in either of the specimens retained, being encrusted with dead animal matter. They were not distinct even after its removal.

379. *Anomia*, sp. ind. *a*. Probably the same species as the two last, although far too dead, worn, and young to decide. See notes on the variations of *A. lampe*, Maz. Cat. p. 168.

380. *Ostrea*, sp. ind. *a*. The hinge notches of the upper valve fit between corresponding teeth in the lower. Inside rather flesh-coloured; white, round margin. Scar kidney-shaped, dark in one valve, light in the other. A young valve is white, and as pearly as *O. iridescens*, M. 211. The species is best known by its tendency to make a very broad limb in the exterior coloured part, spreading out into palmations. A very young specimen, though covered above with *Membraniporæ*, shows the characteristic corrugations through. It may stand provisionally as *O. panamensis*.

381. *Ostrea*, sp. ind. *b*. This is probably a variety of *O. panamensis*, but more coarsely grown, so that there is a smaller limb, without palmations. Wherever the sculpture appears, there are evident traces of the peculiar corrugations. The inside has the same characters, both of hinge, colour, iridescence, and scar.

382. *Ostrea*, sp. ind. *c*. Rather square hinge, without plications; one shell with an umbonal cavity. Pearly white. One specimen is tinted on the scar, which may become coloured in the adult. It is by no means "pentangular," and is more probably=*O. rufa*, Gld., than *O. columbiensis*, M. 213.

383. *Ostrea*, sp. ind. *d*. The shells are broader than the Mazatlan specimens of *O. virginica*, M. 212, probably from not growing on twigs. The younger shells are very like *O. edulis*; the older ones

have hollow umbos. One long shell, first marked *e*, but altered to *d*, is the adult form; several of the younger shells are doubtful.

384. *Ostrea*, sp. ind. *e.*=*Ostrea*, M. 215. Being a good species, I propose the name of *O. amara*. The Professor's "small var." is not plicated, and appears to belong to *O. conchaphila*, M. 214. [N.B. Additional specimens confirm me in the belief that *O. palmula*, M. 214 *b*, is a distinct species.]

385. *Spondylus lamarckii*, C. B. Ad.=*S. calcifer*, M. 208.

386. *Spondylus*, sp. ind. *a*=*Plicatula penicillata*, M. 210.

387. *Pecten inca*=*P. ventricosus*, Sby., as in errata.

388. *Pecten tumbezensis*=*P. aspersus*, Sby., Hanl. (? Lam.).

389. *Lima angulata*. Shells inflated, not gaping.

390. *Lima pacifica* (=*L. arcuata*, Sby., Hanl.). Young shells, species uncertain.

391. *Avicula ?margaritifera*=*Margaritiphora fimbriata*, Dkr., M. 204=*M. mazatlanica*, Hanl.=*M. barbata*, Rve.

392. *Avicula sterna*, M. 203. *A. libella*, Rve., appears to me the young of this species.

393. *Perna*, sp. ind. *a*=*Isognomon chemnitziana*, M. 205.

394. *Perna*, sp. ind. *b*=*I. chemnitziana*, var. Rather more finely grown, and with less colour, but certainly the same species. The Professor's Jamaica specimens are labelled "*bicolor*, Ad."

395. *Pinna maura*, M. 200.

396. *Pinna tuberculosa*. Three of the specimens appear to me =*P. maura*, jun. The other may be the same, but is worn nearly smooth.

397. *Mytilus*, sp. ind. *a*. Resembles the young of *Modiola brasiliensis*, but with a few hinge-teeth, as in *M. edulis*.

398. *Lithodomus*, sp. ind. *a*. Most of these specimens are of *Lithophagus aristatus*, M. 176; one (perhaps two) are *L. attenuatus*, M. 173 (which is found from Lower California to Chili); and one appears to be *L. plumula*, M. 175; but they are too young to decide with confidence.

399. *Modiola ? semifusca*. These specimens all belong to the *M. brasiliensis*, M. 171, but are much more like the ordinary Brazilian specimens than are those from Mazatlan. As compared with the latter, the Panama shells are more rounded, with stronger posterior grooving, and with the angular ridge less marked. A similar shell, undoubtedly from New Zealand, is considered by Mr. Cuming conspecific.

400–404. *Modiola*, sp. ind. *a*, *b*, *c*, *d*, *e*. I could find no *a* or *e* in the collection; but there were two trays marked *f*. Tray *b*=*M. capax*, M. 170. *c* contains several specimens of *Mytilus multiformis*, M. 168, strongly ribbed variety, perhaps intended for *b*, no. 401.

d contains parts of six specimens, and perhaps should be *a*, no. 400. They appear to be a variety of *Lithophagus cinnamomeus*, M. 177, but with broken shells, &c., agglutinized on the posterior side. *f* (1) contains four specimens of *M. multiformis*, the semigreenish variety (Maz. Cat. p. 119), and are probably intended for *c*. *f* (2) contains two specimens of the same variety of *M. multiformis*, in the burrow of a *Lithophagus*, and may stand for *d* or *e*.

405. *Chama buddiana*=*C.* (?*frondosa*, var.) *fornicata*, M. 121, *b*. Additional specimens confirm me in regarding this species as distinct from all varieties of *frondosa*. The Professor's shells not being very characteristic, the diagnoses do not exactly accord. The shell stands as *C. buddiana*.

406. *Chama* ? *corrugata*. The large valve appears a dead reversed *C.* (*frondosa*) *mexicana*, M. 121, with the teeth perforated by *Lithophagi*. The other may be *corrugata*, very dead, of sienna-tint, very pointed dorsally.

407. *Chama echinata*. These appear to me to be the young, partly of *C. buddiana*, but principally of *C. mexicana*.

408. *Nucula elenensis*=*Leda e.*, M. 199.

409. *Nucula exigua*, M. 198.

410. *Nucula polita*=*Leda p.* With semidiagonal lines.

411. *Pectunculus assimilis*+*P. inæqualis*, M. 196.

412. *Pectunculus* ?*maculatus*. Stet.

413. *Arca alternata*=*Barbatia a.*, M. 188.

414. *Arca* ?*aviculoides* appears a young *Scapharca*.

415. *Arca emarginata*=*Scapharca e.*, M. 187.

416. *Arca gradata*=*Barbatia g.*, M. 194.

417. *Arca grandis*, M. 180.

418. *Arca mutabilis*=*Byssoarca m.*, M. 190.

419. *Arca* (*Byssoarca*) *pholadiformis*. This is simply an elongated form of *Barbatia gradata*, probably from growing in the hole of a *Lithophagus*. The umbos are "flattened" by erosion; teeth not "obsolete" under the glass; "ligament concealed" simply by the compressed and elongated growth.

420. *Arca reeviana*=*Barbatia r.*

421. *Arca reversa*=*Noetia r.*, M. 185.

422. *Arca similis*. This is scarcely a variety of *A. tuberculosa*, M. 184. The specimens are dead and oiled, with most of the epidermis abraded.

423. *Arca solida*=*Barbatia s.*, M. 195.

424. *Arca* (*Byssoarca*) *tobagensis*=*Barbatia illota*, M. 193.

425. *Arca tuberculosa*, M. 184.

426. *Arca*, sp. ind. *a*. These little shells approach the *Noetia*

type. Ribs fine, tuberculous, coarse on the angular side. Ligament very narrow, truncated.

427. *Cardita affinis.* (*Lazaria.*)

428. *Cardita laticostata*=*Venericardia l.*

429. *Cardita radiata.* (*Lazaria.*)

430. *Cardium graniferum*, M. 134.

431. *Cardium obovale*=*Hemicardia o.*

432. *Cardium planicostatum*, C. B. Ad., not Sby. This looks like a dead ballast-valve of *Hemicardia media*; but it may be *H. biangulata.*

433. *Cardium procerum*, M. 125.

434. *Cardium senticosum*, M. 126.

435. *Venus ?amathusia*=*Anomalocardia subimbricata*, M. 113.

436. *Venus discors*=*Tapes gratus*, Say, M. 110. The Professor's specimens of this species and *T. histrionicus* are somewhat intermixed.

437. *Venus gnidia*, M. 101. Dead specimens; of which one may possibly be *Chione amathusia*, M. 102.

438. *Venus multicostata.* Closely resembling the West Indian form.

439. *Venus pectunculoides*=*Tapes histrionicus*, M. 109.

440. *Venus subrugosa*=*Anomalocardia s.*, M. 112.

441. *Venus*, sp. ind. *a.* A small species with concentric laminæ, armed with one posterior row of blunt spines. Interstices with minute concentric striæ.

442. *Venus*, sp. ind. *b*=*Chione crenifera*, M. 105=*V. sugillata*, Rve. C. I. no. 43.

443. *Cytherea affinis.* Probably=*Callista concinna*, var., M. 99.

444. *Cytherea aurantiaca*=*Callista aurantia*, M. 92.

445. *Cytherea consanguinea*=*Callista c.* Messrs. H. and A. Adams have not made a subgenus to include this group of thin, inflated, almost colourless species.

446. *Cytherea radiata*=*Trigona r.*, M. 83.

447. *Cytherea squalida*=*Callista chionæa*, M. 93.

448. *Artemis dunkeri*=*Dosinia d.*, M. 90.

449. *Artemis saccata*=*Cyclina subquadrata*, M. 91.

450. *Gouldia pacifica*, M. 116.

451. *Cyrena maritima.* Stet. The collection also contains two tubes, containing a very young "*?Cyclas*" and another "*Cyrena*, jun.," marked "Panama, C. B. Ad."

452. *Lucina tellinoides*=*Felania t.* Differs from *F. sericata*,

M. 152, in having a yellow, not silky, epidermis. The specimens vary considerably in thickness. The genus scarcely differs from *Miltha*.

453. *Capsa altior=Iphigenia a.*, M. 69.

454. *Donax assimilis*, M. 74.

455. *Donax gracilis*. Stet.

456. *Donax navicula*, M. 77.

457. *Donax rostratus*. This single valve proves to be the true *D. carinatus*, M. 71, and not the shell which I called *D. culminatus*, M. 72 (=*carinatus*, var., Hanl. in Mus. Cum.), which I subsequently affiliated to the supposed *rostratus*, Maz. Cat. p. 548, on the authority of Dr. Gould's specimen. We were probably both misled by the "*very sharp* angle," which (as compared with the other form) I should call *rounded*, and the "concave" surface, which I should translate into flat. The names have been altered in the Cumingian collection since the Mazatlan shells were identified; but Mr. Hanley informs me that they are now correct; that the *D. culminatus*, M. 72, is his own original *carinatus*; and that the *D. carinatus*, M. 71 (olim Mus. Cum.), which is certainly *D. rostratus*, P. 457, must stand under Prof. Adams's name.

458. *Tellina aurora*. Stet.

459. *Tellina cognata*, C. B. Ad.=*Psammobia casta*, Rve., *teste* Cuming. The sculpture consists of semidiagonal striæ passing over the lines of growth. In other specimens examined from Panama these are sometimes crowded, sometimes distant, occasionally flexuous, sometimes almost evanescent.

460. *Tellina columbiensis*. (*Peronæa.*)

461. *Tellina concinna=Macoma c.* The "slight tinge of pink" I could not discover.

462. *Tellina crystallina=Tellidora c.*

463. *Tellina cumingii*, M. 55.

464. *Tellina dombeyi=Macoma d.*, M. 50.

465. *Tellina felix*, M. 51. (*Angulus.*)

466. *Tellina laceridens*. (*Peronæoderma.*)

467. *Tellina prora*. (*Peronæoderma.*)

468. *Tellina puella*. Not unlike *T. felix*, and distinct from M. 59.

469. *Tellina rubescens*. (*Peronæoderma.*)

470. *Tellina siliqua*. The two odd valves belong probably to a *Macoma*, in shape resembling *Thracia phaseolina*.

471. *Tellina simulans=T.* (*Peronæoderma*) *punicea*, M. 54. The species was described, for geographical reasons, from a young, pale, and undeveloped valve. On comparing it with the Professor's own West Indian specimens, I could detect no difference.

472. *Tellina sincera*=*Strigilla s.*

473. *Tellina vicina*=*Heterodonax vicinus.* The shells are labelled *T. versicolor* by the Professor. They are larger than the general run of West Indian specimens; but the form is probably a local variety of the old *Heterodonax bimaculatus.*

474. *Tellina*, sp. ind. *a.* The doubt concerning "concave" and "convex" probably arises from an error in description.

475. *Tellina*, sp. ind. *b.* Looks exactly like the young of No. 474, but with lateral teeth.

476. *Tellina*, sp. ind. *c.* Dead valves of *T. felix*, No. 465.

477. *Petricola cognata.* More characteristic specimens from the same coast are affiliated by Mr. Cuming to *P. pholadiformis*, from which this would probably not have been separated had it appeared on the Atlantic coast.

478. *Saxicava ? tenuis.* The Panama shell is more like *Petricola* than *Saxicava*, having two teeth in each valve, one of which is bifid. Sowerby's species is called by Messrs. H. & A. Adams "*Saxicava tenuis*" (ii. p. 349) and "*Petricola tenuis*" (ii. p. 441). Shell with very fine radiating striæ, crossed by irregular striæ of growth.

479. *Cumingia coarctata*=*C. lamellosa*, var., M. 42.

480. *Cumingia trigonularis*, M. 43.

481. *Cumingia*, sp. ind. *a*=*C. trigonularis*, No. 480.

482. *Cumingia*, sp. ind. *b*=*C.* var. *coarctata*, No. 479.

483. *Cumingia*, sp. ind. *c*=M. 45. This appears a distinct species, and may be quoted as *C. adamsii*, in remembrance of the labours of Messrs. H., A. and C. B. Adams.

484. *Cumingia*, sp. ind. *d*=Maz. Cat. tablet 107, p. 31; well rounded, with close striæ. Probably distinct.

485. *Amphidesma bicolor*=*Semele ? venusta*, M. 41 (non A. Ad.). The "species" in this genus are often separated by very variable characters.

486. *Amphidesma ? ellipticum*=*Semele e.*

487. *Amphidesma proximum.* The type is not quite so elliptical as the last species; but as this is a very variable character (*v.* Maz. Cat. p. 28), I should regard it as the same. It is not the *Semele proxima*, M. 40 (=*S. flavescens*, v. Maz. Cat. p. 548).

488. *Amphidesma pulchrum*=*Semele p.*

489. *Amphidesma striosum*=*Semele s.* I should describe the shell as smooth, with very fine diagonal striæ crossing the lines of growth. It has the general aspect of *S. pulchra.* The teeth in one valve are long and sharp.

490. *Amphidesma tortuosum*=*Semele t.* Teeth short and faint.

491. *Amphidesma ventricosum*=*Semele v.* The "zones" are *very*

"ill-defined." Teeth scarcely visible. It looks outside like a dead valve of *Macoma solidula*.

492. *Crassatella gibbosa*. Also found at Cape St. Lucas.

493. *Mulinia donaciformis*=*M. angulata*, M. 80.

494. *Mulinia ventricosa*=*Mactrella exoleta*, M. 78.

495. *Lutraria elegans*=*Harvella elegans*; ascribed by Messrs. H. & A. Adams to Florida (ii. p. 378), from which I have never seen it. It is a rare, but (under different names) somewhat widely diffused west-tropical shell. Its "analogue" from Florida and Carolina is *Raëta canaliculata*.

496. *Mactra velata*=*Standella v. Vide* M. 79. The "small variety" is conspecific.

497. *Anatina alta*. This valve of *Periploma* may prove identical with one of the four Gulf species. The spoon is supported underneath by a linear plate.

498. *Pandora cornuta*. It is singular that neither Prof. Adams nor Dr. Gould observed that the peculiar characters of this species are due to a fracture, producing a beak and sinus which are not seen on the lines of growth. The sentences about the "rostriform projection," the "sinus," and the "prominent angle," should therefore be erased from the diagnosis. The hinge-teeth consist of a long sharp tooth, very pointed, in one valve, fitting against a less prominent one in the other; a slight ligamental tooth in the first valve only; and a very long, sharp, clavicular tooth in each valve, running near the posterior margin, against the inside umbonal portion of which the ligament is attached. Should it prove identical with *P. clavicula*, the earliest name (as being given in error) may advantageously be dropped. It is surprising that Messrs. H. & A. Adams have not divided the old Lamarckian genus even into subgenera.

499. *Potamomya æqualis*. 500. *P. inflata*. 501. *P. trigonalis*. These three forms of *Azara* differ in outline, but not more than do some other species of Corbulids and such shells as *Trigona radiata*. The teeth, pallial lines, and general characters are the same in each. The first two I should consider certainly identical; and a large series of specimens would probably graduate to the third.

502. *Corbula bicarinata*, M. 30.

503. *Corbula biradiata*, M. 31.

504. *Corbula obesa*. Stet.

505. *Corbula ovulata*, M. 33.

506. *Corbula rubra*. A young orange-tinted specimen of *C. biradiata*, No. 503. The "broad flexure" is an accidental growth, not shown in the lines of growth of an earlier stage.

507. *Corbula tenuis*. Stet.

508. *Corbula*, sp. ind. *a*. A very small angular valve, with sharp concentric ridges. It may belong to *C. pustulosa*, M. 32.

509. *Corbula*, sp. ind. *b*. Dead valves of *C. biradiata*, No. 503. To the same species may be referred *C. polychroma*. We were misled by the different appearance of the dead shell, and by the locality-mark in Col. Jewett's collection. His specimens were probably from Panama or Acapulco.

510. *Solecurtus affinis*, M. 37. It is probable that this species is identical with *S.* (?*Novaculina*) *caribbæus*. The Ariquibo specimens of the latter in Mus. Amherst. are more like the Mazatlan shells than those are to the Panama type. Shells from Cape Palmas were affiliated to the Caribbæan species by Mr. Cuming.

511. *Solen rudis*=*Ensatella r*. This interesting form passes towards *Pharella*. It is called "*Solena obliqua*, Spengl., var." in Mus. Cuming.

512. *Pholas crucigera*. With the general aspect of *Barnea candida*.

513. *Pholas tubifera*=*Pholadidea t*. Of the *melanura* type, with a solid tube fitting on to the ends of the cups.

514. *Pholas xylophaga*. Of the *Martesia* type, without cups. Dorsal and ventral plates long; umbonal plates moderate; wave of the adolescent gape rather suddenly arched.

515. *Pholas* ——, sp. ind. *a*. Col. Jewett's specimens of the same shell are named *laqueata* by Mr. Cuming. It is of the non-waved concameroid type; without radiating sculpture; concentric lamellæ beautifully frilled.

516. *Pholas*, sp. ind. *b*. So like *P. dactylus* that it might be taken for a worn valve from ballast. The sculpture-ridges are, however, further apart; hinge-chambers larger and more numerous, with a little twisted lamina beyond; gape less conspicuous.

517. *Orbicula cumingii*=*Discina c*., M. 14.

The shells unfortunately are all loose, in trays, with the autograph names on tickets. Prof. Adams's West Indian collections are in the same condition; and both series are arranged together, in zoological order, in the midst of the general collection. There is no evidence, however, that they have been handled since the Professor left them, none of the leading conchological writers in the New World having thought it needful to go out of their way to complete a review of the Professor's work. Amherst is situated on a branch railway, and is within an easy walk of Northampton, Mount Holyoak, and the delicious scenery of the Connecticut River. In the College buildings are also deposited the most complete series of the Fossil Footprints of the Connecticut River, and the mineralogical collection (including the meteorolites) belonging to Prof. Shepherd.

November 10, 1863.

E. W. H. Holdsworth, Esq., in the Chair.

The Secretary informed the Meeting that the Council of the Society had determined to send out Mr. James Thompson, the Society's Head Keeper, to Calcutta by the next steamer round the Cape, to take charge of a young Rhinoceros, a young Gibbon, and other valuable animals offered to the Menagerie by Mr. Arthur Grote, Corr. Memb.

From Calcutta Mr. Thompson would proceed to Akyab to receive another collection offered to the Society by Mr. William Dunn, Corr. Memb., and return to England by the steamer from Calcutta in March or April next.

The Secretary read the following extract from a letter addressed to Mr. E. Blyth by Mr. Dunn, enumerating the specimens living in his possession on the 10th of August last, stating that Mr. Blyth had made over to the Society his interest in these animals, which had been offered to him personally with the wish expressed in some cases that they should find their way into the Society's Gardens.

"At present I possess specimens of the following [animals], which are undergoing probation; for it would be useless to ship off creatures fresh from the jungles, and hence it is a great expense keeping them at present.

"*Hylobates lar*. Tawny-white.

"*H. hoolock*. [I have no doubt that light and dark varieties of *H. hoolock* are here intended.—E. B.]

"*Inuus nemestrinus*. [Individual seen by me at Akyab; captured in the immediate vicinity.—E. B.]

"*I. leoninus*. Female; very quiet, and full-grown.

"*Galeopithecus volans*. Obtained about 100 miles up the Kaladyna river [which flows into Akyab Harbour from the north]. I thought it was never seen so far north. There is no doubt of the identity of the animal. I shall be extremely loath to part with it, unless to some person who will take careful charge of it.

"*Arctonyx collaris*. A young specimen.

"*Viverricula malaccensis*.

"*Felis bengalensis*. Male and female.

"*F. nipalensis*. Young. [*F. viverrina* is probably here intended.—E. B.]

"*Hystrix bengalensis*. Very large.

"*Ursus malayanus*. Young.

"*Sus* sp.? Young boar, striped.

"*Rusa hippelaphus*. Young male [Indian Sambur].

"*Panolia acuticauda* [*Cervus frontalis*, M'Cl. &c.]. Male, in very good condition, and young female. An agent of the Amsterdam Society wishes to purchase them; but if I could get them to the London Society, I should be delighted.

"As regards young Gayals (*Bos frontalis*), I will endeavour to procure a pair; but there will be some difficulty in getting them down to Akyab, and the cost even there would be from £12 to £15. Then you would have to incur the cost of freight and charges to England; for I could not possibly get them taken for nothing.

"Of birds I have the following, also undergoing probation:—

"*Aquila nævia*. Now very quiet and resigned.

"*Otogyps calvus*. Two specimens.

"*Vultur indicus*. One bird; at present not looking healthy.

"*Ninox scutulata*. Rather a noisy fellow in the evening.

"*Surnia dumeticola* [*Ketupa ceylonensis*].

"*Buceros pusaran*. Three specimens.

"All my specimens of the *B. cavatus* I have sent to the London Society, also the *B. tickelli* from the Kaladyna range.

"*Trogon erythrocephalus*. Very difficult to procure alive.

"*Sturnidæ*, various species, inclusive of *Ampeliceps coronatus*.

"*Pycnonotus*, five species.

"*Treron phœnicoptera*.

"*T. bicincta*, a pair.

"*Columba intermedia*.

"*C. punicea* (Rangoon).

"*Argus giganteus*. Male. This you may have; but I should like to procure a female, if possible.

"Black, White, and King Curlews [i. e. *Falcinellus igneus*, *Threskiornis melanocephalus*, and *Geronticus papillosus*.—E. B.]

"*Grus antigone*.

"Adjutants. Two.

"Of Reptiles—

"Flying Lizard [*Draco*].

"Sand-Lizard [*Leiolepis reevesii*].

"*Dilophyrus grandis*.

"Green Lizard [*Calotes*?].

"*Bungarus fasciatus* (9 feet 5½ inches), *B. cæruleus* (15 feet!), *Hamadryas vittata* (11 feet), and sundry other Snakes, venomous and non-venomous."

The following extract from a letter addressed to the Secretary by M. Jules Verreaux, Corr. Memb., describing the female of *Perdix barbata* (see P. Z. S. 1863, p. 62), was read:—

"PERDIX BARBATA, fœm.

"*Capite, barba, gutture maculaque pectorali cervinis; pectore, ventre et scapularibus fulvo-albidis: tergo et alis cervinis, brunneo maculatis et albo variegatis.*

"La tête comme chez le mâle avec moins de brun, et plus de blond-roux en-dessus. Le gris remplacé par un fauve-blanchâtre. La grande tache noire abdominale remplacée à peine par deux ou trois plumes d'un brun-noirâtre. Tout le dessus du corps harmonieusement nuancé de brun et de blond.

"Au total, l'oiseau tout en étant bien la femelle authentique de l'espèce, puisque trois exemplaires sont semblables, revêtе plutôt, dans l'ensemble de son plumage, l'apparence d'une variété que de son état normal."

Mr. Fraser exhibited a remarkably large specimen of the skull of the Gorilla.

The Secretary read several communications addressed to him by Dr. George Bennett, F.Z.S., respecting the arrival of specimens of *Didunculus strigirostris* in Sydney. The first of these, dated June 18th, 1863, contained the following notes on this subject:—

"In the early part of June 1863 a living *Didunculus* was brought to Sydney by Mr. J. Williams from Apia, Upolu, one of the group of the Navigator Islands; and on the 15th of June and the following days I had several opportunities of examining the bird. At first it seemed rather shy and wild, but afterwards it became more tame, and I could examine it without its manifesting any fear. It is about the size of a Nicobar Pigeon (*Calœnas nicobarica*), but rather bulkier and rounder in form. Its plumage was not in good condition, owing to its having been recently confined in a cage on board ship, but it appeared healthy. This specimen, I should say, was a young bird with immature plumage, and the tooth of the lower mandible not yet developed. When I first examined it, the bird showed its fear by occasionally uttering some rapid 'coos' and by fluttering in its cage, but it subsequently became quite tame. It was captured, on the Island of Upolu, after being wounded in the wing, and was sold by a native to Mr. Williams. It has now been in captivity about nine months, and is kept in a cage, which is merely a box with rails in front, like a hen-coop. Here it can run on the floor, or sit on a low perch, or conceal itself in the corners, as it is particularly fond of doing, where, with its dark-coloured plumage, it cannot readily be distinguished. When disturbed, it would move gently and timidly across the cage, affording an excellent opportunity to the observer of examining it. It is a stupid-looking bird, and has no particular attraction, except the anomalous and extraordinary form of the beak, which cannot fail to excite the attention of the most ordinary spectator. The only sound it utters is the quick 'Coo-coo-coo,' to which I have already alluded, the beak being always a little open when the notes were emitted. The whole of its plumage is of a chocolate-red colour, deeper in tint on the back, tail, and the primaries and secondaries of the wings, the throat, breast, and wing-coverts being barred with light brown. The upper part of the head was rather bare, from the feathers having been rubbed off; but what remained were of a dark slate-colour. The base of the beak is orange-red, and the rest of the mandibles of a yellowish hue. The tarsi are not feathered; and the legs and feet are of a bright orange-red, similar in colour to those of the Kagu. The irides are dark reddish brown, and the cave round the eyes is flesh-colour. The bird is fed upon boiled rice, yams, and potatoes."

Dr. Bennett's second letter, dated July 18th, contained the following additional particulars:—

"I have to add to my account of the bird sent last mail that this bird was captured within five miles of Apia, Island of Upolu; so that the bird is not yet quite extinct in that island, as has been supposed even by the resident missionaries. It is very fond of the mountain-plantain, upon which it has often been found feeding in its wild state."

A third letter from Dr. Bennett (dated August 19th) contained the gratifying intelligence that a second specimen of the *Didunculus* had reached Sydney, and that Dr. Bennett, with his usual liberality, had purchased the pair of birds, and was intending to send them home to the Society the first convenient opportunity. The following extracts were read from this last communication:—

"Since my last letter another living specimen of the *Didunculus* has been brought to Sydney, by the Rev. Mr. Rigg, who procured it from a native on the Island of Savaii. This I have reason to believe is the identical bird that Mr. Trail, at the instigation of Mr. O'Hea, endeavoured to procure for me, as, in reply to Mr. Trail's inquiries respecting the bird, the native informed him it had just been sold to a European on the other side of the island. On the day after the arrival of the vessel, I went on board and saw the bird, which is a much finer specimen than the one in the possession of Mr. Williams. It appears to be fullgrown and in adult plumage, the head, neck, breast, and upper parts of the back being of a glossy greenish black; back, wings, tail, and under tail-coverts a deep chocolate-red colour; but I consider that the bird has only recently been changing its plumage, and that the present dark-green feathers will become more brilliant, and the chocolate-red colour of a still brighter hue. The legs and feet are of a bright red colour, and the claws yellowish white. The mandibles are of an orange-red colour, shading off near the tips to a light yellow. The cere round the eyes is also of a bright orange-red colour; eyes brownish black. It is agreed by every one with whom I have conversed, who have resided at the Navigators' Islands, that the *Didunculus* is nearly extinct, both from being eaten by the natives as well as from the cats, rats, and other vermin, and that most of the other Ground-Pigeons are following its fate from the same causes. The possessor of the last bird says he has never observed the bird to drink water since it has been in his possession. Its food at that time consisted of boiled yams, but it will eat bananas, apples, bread, and boiled potatoes. The lower mandible has the tooth well developed. This bird was very tame, and was eating some boiled yam very voraciously during the time I was inspecting it, bolting down very large pieces.

"This morning I examined both birds. They are evidently moulting, and the younger bird has grown very much since I last saw it, and is becoming now a much larger bird than the last arrival; from this I am inclined to think they may prove male and female. I this afternoon purchased these birds, after some difficulty. It is my intention to send them by Mr. Broughton of the 'La Hogue,'

unless some very good opportunity occurs in the mean time, which is not probable. Our Acclimatization Society of New South Wales are desirous of purchasing one or both, and to send them to your Gardens in their name; and I have, at all events, secured them for myself at present, but will let you know how they are progressing every mail. I hope these valuable birds will reach you alive; but should they die, I shall arrange to have them preserved in spirits, as the bodies, from their rarity, are also, I am aware, very valuable.

"We purchased last month a fine specimen of the 'Lyre-bird' (*Menura superba*), intending to send it to the Zoological Society. It was captured in the Illawarra district, and was a male; and the beautiful 'lyre'-shaped tail was fully developed, and the whole of the plumage in excellent condition. It only survived a few days, showing how difficult it is to keep these birds in captivity."

The following papers were read:—

1. On some New and Interesting Animals recently acquired for the Society's Menagerie. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

(Plates XXXI.–XXXIV.)

During the course of the past summer several new or otherwise interesting Vertebrates have been obtained for the Society's Menagerie. Mr. Wolf's ready pencil has transferred to the stone some spirited drawings of some of these species, which I now exhibit, and at the same time beg to offer some few remarks on these and other species now or recently living in the Society's collection.

Mammalia.

1. Lagothrix humboldtii. (Pl. XXXI.)

(*Simia lagotricha*, Humb. *Lagothrix humboldtii* auct.)

Two fine examples of this rather rare American Monkey were purchased from a Liverpool dealer on the 2nd of October last. I am not aware that the species, though frequently kept tame on the Amazons, has been brought alive to this country since 1850, when the Society had a specimen for a short time. These Monkeys seem dull and quiet in confinement, and have certainly none of the liveliness that distinguishes the Spider Monkeys (*Ateles*).

The true habitat of this Monkey, as we are informed by Mr. Wallace, is "the district south-west of the Rio Negro, towards the Andes"*. Humboldt, its original discoverer, obtained it on the Guaviaré, a branch of the Orinoco, where it is called "Caparro"†.

2. Mycetes seniculus (Linn.).

We are indebted to the persevering efforts of our Corresponding

* See P. Z. S. 1852, p. 108.
† Obs. de Zool. i. p. 321.



J. Wolfe del. et lith.

M. & N. Hanhart imp.

LAGOTHRIX HUMBOLDTII.

BRITISH
3 AU 64
MUSEUM



W.Prockl.Lith.

M & N Hanhart imp.

GALAGO ALLENI.

BRITISH
3. AU 6a
MUSEUM



J. Wolf del. et lith.

M. & N. Hanhart, imp.

BUBO FASCIOLATUS.


BRITISH
3 AU 64
MUSEUM



BRITISH
3 AU 64
MUSEUM

Member Mr. Edward Greey for the first two Monkeys of the genus *Mycetes* that, as far as I am aware, have ever been brought alive to Europe; and though these animals did not live long with us, they sufficed to give us some idea as to the external appearance of this very distinct form of Platyrrhine Monkey, and to furnish fresh specimens for the anatomical examination of the brain of the genus, which were greatly needed.

Mr. Greey obtained these Monkeys from the forests on the Dekke River, near Cartagena, a district which Humboldt (Obs. de Zool. i. p. 342) also gives as a locality for this species.

3. Galago alleni. (Pl. XXXII.)

In June last a fine living specimen of this beautiful *Galago* was presented to us by our Corresponding Member, Mr. Ashmall, having been obtained by that gentleman's agents in the Cameroons River, West Africa.

The *Galago alleni* was described by Mr. Waterhouse before this Society in 1837*, from an example obtained by Lieut. Allen in Fernando Po. As it has never been figured, and does not appear to be well known on the continent, Mr. Wolf's lively sketch of this species will be acceptable.

4. Nycticebus tardigradus (Linn.).

Although specimens of the slow *Loris* have been frequently exhibited in the Society's Gardens, and the species is one figured by Mr. Bennett in his work on the Society's Menagerie, I am not aware that specimens of this Lemur have been previously received from China. Yet two examples, which appear to be of this species and have lately been presented to the Menagerie by Dr. Coghlan, are stated to have been obtained at Canton. It is very possible, however, that they may have been imported animals.

Dr. Coghlan sends me the following notes on these animals:—

"The male and female Loris were brought to England by me in the 'Sphinx,' Commander F. M. Jones. They had been procured in the south of China (where they abound), and given to Dr. Dods, of Canton, who presented them to me.

"These curious little animals lived in confinement without any apparent ill effects; and during the voyage, which occupied over four months, required but little attendance or watching, their principal want (with the exception of food) being shelter from the cold, to which they were very sensitive, and from which their beautiful thick soft brown fur did not seem to protect them sufficiently.

"They ate plantains and bananas with avidity, rice but with little relish, and small birds with great voracity. They never drank water when presented to them, but left it unheeded or merely lapped at it once or twice. They devoured rice abundantly at night, but would eat also in the daytime. They generally slept throughout the day,

* See P. Z. S. 1837, p. 87.

coiled up in a sitting posture, with the head between the forearms, and the nose against the chest; they always seemed to sleep close to each other. When roused up, they appeared for a time to dislike the light of day, but would after a time either lick each other's fur or walk and play about. Their large round beautiful eyes, with their gentle and mild expression, seemed to shun the light. Their affection, though undemonstrative, was apparently sincere, and they seldom if ever appeared to quarrel, except slightly when eating the same bird; they never played with one another, unless the licking the fur be considered play. They made a peculiar chattering noise when angry; and when pleased at night they uttered a sharp though tuneful whistle of one unvaried note; this whistle is thought by Chinese sailors, who take them to sea, to denote the coming of wind. They remained awake, as a rule, during the whole night, moving about the cage, and throwing themselves into different attitudes, hanging to the bars by one, two, or three hands, or holding on by the two hinder hands, seesawing themselves to and fro and rubbing the head along the bars, somewhat in the manner of a bear. Their intelligence seemed to be much below that of the Monkey (a fact which the expression of their eyes seemed to deny); they merely recognized my calling them by the words 'old boy,' and by my uttering a whistle something like their own. During a gale of wind in April, off the south-east coast of Africa, a young *Loris* was born (an event which was quite unexpected by me); the little thing was about 4 inches long, and was covered with fur; it held on by its four hands to the mother's fur, and in that attitude sucked the milk from its parent's breast. On looking at the cage next morning, I found it dead, with part of the head and one leg eaten. In this manner they more resemble tame rabbits, who sometimes eat their young when watched. For a long time afterwards I suspected the male sucked the breast of his partner, and I am almost certain that he did so. I would recommend that they be fed with one or two small birds (sparrows and such like) a day, some rice at night, and if possible some fruit allied to the plantain or banana. They require some place where they can climb and use their limbs freely. I need enter into no description of their anatomical structure. Their movements are very slothful."

Aves.

1. Bubo fasciolatus. (Pl. XXXIII.)

We obtained a specimen of this very distinctly marked African Horned Owl by purchase from a dealer on the 12th of August last. The species has not, so far as I know, been previously brought alive to Europe. The bird is not quite adult; but as far as one can tell, without bringing the specimens side by side (which is at present hardly practicable), it seems to agree sufficiently with the typical specimen of *Bubo poensis* of Fraser in the British Museum.

Dr. Hartlaub identifies *Bubo poensis* with *B. fasciolatus*, Temminck, MS. (described in Cabanis's Journal für Orn. 1855, p. 354).

2. PHLOGŒNAS BARTLETTI, sp. nov. (Pl. XXXIV.)

Of this very fine new species of Ground-Dove the Society possess four living specimens, which were purchased by Mr. Bartlett of a dealer at Liverpool in August last. As they are placed in the same compartment of the Western Aviary as a pair of the better-known *Ph. cruenta*, the differences which distinguish these closely allied species are very evident on comparison.

The pectoral mark in the present bird is much larger, and of a maroon colour or chocolate-red instead of a blood-red. The head and neck of the present species are of a metallic green, instead of lead-colour as in *Ph. cruenta*. The back and shoulders are of a rich brown instead of a slate-colour. Other differences are apparent on an accurate examination of the species; and these I propose to give in a specific diagnosis of the new bird, as soon as I can examine a dead specimen. In the meantime Mr. Wolf's drawing (Pl. XXXIV.) will render it easily recognizable.

I propose to confer upon this species the name of Mr. E. B. Bartlett, the able Superintendent of the Society's Gardens, whose discriminating eye recognized the novelty and the value of these birds as soon as he perceived them, and whose merits are too well known to the present Meeting to render necessary any apology for my so doing.

These Pigeons were stated to have been brought from an uninhabited island near the Philippines. Their close alliance to the *Phlogœnas cruenta* (which is, I believe, from the island of Luçon) renders it almost certain that they belong to a representative species found in some other island of the Philippine group.

3. CHAUNA CHAVARIA (Linn.).

A fine young example of this species of Screamer was received on the 27th of July last, from the Dekke River, near Cartagena, New Granada, where it was obtained by Mr. E. Greey, our Corresponding Member, and liberally presented to the Society's collection.

Not being aware that the *Chauna chavaria* was found so far north, and fancying there was some difference in the plumage of this bird from specimens I had previously seen, I was at first inclined to think the bird might belong to the scarce species *Chauna derbiana*.

I am now satisfied that this is not the case, and that the bird is not specifically different from the *Chauna chavaria*. Yet it is of much interest, being from a locality new for this species, and not having been exhibited in the Society's Gardens for several years.

Mr. Greey has subsequently sent us three more examples of this same species, only one of which reached us alive, and that, unfortunately, in so reduced a state as not to survive long. At the same time Mr. Greey furnished me with the following note concerning this bird:—

"The following is all the information I can collect about the *Chauna*:—It lives in the swampy lagoons of New Granada, is not a common bird; builds its nest on the waters, and incubates by striding the nest. It utters three peculiar sounds—a trumpet-like

scream, a gobbling Turkey-like noise accompanied by a peculiar bowing of the head, a hollow rumbling noise in its inside when enraged. Another peculiarity of the species is the cellular membrane between the skin and the flesh being capable of distention, this accounting doubtless for the rumbling sound emanating from its inside. It has two spurs on each wing; when attacked, it throws back its head, brings forward its wings, and stands on the principle of 'defence, not defiance.' It will kill snakes, and, though very wild in its natural element, becomes very docile when associated with other fowl."

Reptilia.

1. Tropidonotus ferox, Günther, Ann. N. H. ser. 3. xii. p. 355.

This species of Snake has lately been described by Dr. Günther from a specimen in the British Museum, said to have been obtained from Fernando Po.

On the 16th of July last I purchased for the Society a fine living example of the same species from Mr. Jamrach, said to have been brought home by the West-African mail, and probably also from Fernando Po. Dr. Günther, speaking of this Snake, says:—

"It is very fierce, and when driven into a corner of its cage will raise the anterior portion of its body and open its mouth, ready to strike. It is very nimble, and I never succeeded in catching it without being bitten."

This Snake is of much interest, as the genus *Tropidonotus* was not previously known to extend into Western Africa. Our specimen, having died, has been deposited in the British Museum.

2. Natural-History Notes made during a passage from Liverpool to Vancouver Island (Dec. 1862 to June 1863). By Dr. D. Walker, Corr. Mem.

During the passage to the equator the towing-net was as frequently used as the weather would permit. Among the captures were specimens of *Ianthina communis* and *Æquorea cyanea* in the latitude of the Straits of Gibraltar; off Madeira *Physalia pelagica* was very abundant, and some specimens of *Cymba sagittata* and *Pyramis tetragona*, also *Hyalea tridentata*; near Palma some Pteropods, including species of *Creseis*, *Cuvieria*, and *Cleodora*, were obtained. A few Bonito (*Thynnus pelamys*) and Albicore were occasionally met with during the north-east trade; and on the line, quantities of *Coryphæna* surrounded the ship, and one species of *Centrolophus* was noticed. No birds of particular interest were seen until we were off the coast of Patagonia, when a flock of Martins (*Hirundo purpurea*) came off from the land, and, alighting on the ship, were caught; two species of Albatros (*Diomedea chlororhyncha* and *D. fuliginosa*, Gm.) were very common. In the Straits of Le Maire we had visits from *Procellaria gigantea* and *P. æquinoctialis*; and *P. glacialis* was abundant,

also *Daption capensis*. *Thalassidroma wilsonii* replaced the *T. pelagica*, which had been so plentiful in the Bay of Biscay. Off the north end of the Straits I dredged in 65 fathoms, sand and stones, and obtained two specimens of a *Galathea*, several of an *Ophiocoma*, and a *Palæmon*; these I have not minutely examined as yet. There came up also a very good specimen of *Serolis fabricii*; this I closely examined:—"Only one specimen, marbled and beautifully sculptured. Anterior antennæ of four joints; first and second joints of equal size; third wider at base than apex; fourth narrower and slightly longer than third; flagellum long and narrow, twice the size of third joint; setæ at the termination of fourth joint. Inferior antenna has three joints; its peduncle is equal in length to three joints of anterior antenna; flagellum same length as second joint of inferior antenna; both antennæ are fringed with cilia, and have second and third joints of peduncle somewhat flattened. First four joints of pereion and the cephalon have the carina prolonged backwards into a tooth. First four pereiopods long and slightly curved; extremity of each joint furnished with a tuft of stiff hairs. First gnathopod pectinated on inner side of hand with a long finger. Telson short and bluntly pointed. Between the eyes there are five protuberances, two of them horizontal between the anterior cornua, two lying anteriorly and posteriorly between the posterior cornua, and a large one intermediate between the latter." The two before-mentioned species of Albatros accompanied the ship as far north as 30° S. From 28° S. to 5° S., each day we were visited by flocks of Tropic-birds; several were shot, but only one obtained, as fortunately it fell on the deck. I made some notes at the time before preserving the skin:—"*Phaethon phœnicurus*. From tip of beak to tip of longest ordinary tail-feather 18½ inches; one red tail-feather 9 inches; from tip of beak to extremity of commissure 3·6, 2·3 to extremity of nasal opening. Bill red, with dark brown streak extending for ½ an inch before and behind the nasal opening; eye dark brown, with a narrow dark fringe round the eyelid, and for ½ an inch above and behind it; outside of wing- and tail-feathers with black shafts, white towards their ends, some of the tertiaries blackish; red tail-feathers same width throughout, with a black shaft; feathers close to the vent blackish; ten tail-feathers; a few dark spots scattered over the body. Colour satin-white, with rosy tint. Legs white, shading to blue, with dark webs; claws strongly curved. 18° 30′ S. lat., 102° W. long.—April 20, 1863."

Only one specimen of the Frigate-bird (*Fregata aquila*) was here seen. On the equator again the Dolphins swarmed about the ship as before, accompanied by Bonito and Albicore, the flying fish being abundant. Some specimens of *Xanthichthys* were obtained. Two Sharks were caught, one blue, the other grey; they had numerous *Remoræ* attached, and were piloted by *Naucrates ductor*. Quantities of *Porpita glandifera*, lying on the top of the water, floated by us; they had also been noticed on the line, in the Atlantic. Strong breezes prevented the use of the towing-net in the Pacific. From 5° N. to 34° N. we again had Tropic-birds, some of which appeared

different species from *Phaethon phœnicurus*, the under plumage being of a duller tint: none could be obtained, although many were shot. In 34° N. lat. and 140° W. lon. the sea, for two days in a calm, swarmed with a species of *Vitella*: no square foot of the ocean within sight was without four or five of them. I have never seen life so abundant. North of the line we had always some Albatroses accompanying the ship; some were caught; they belonged to *Diomedea nigripes* of Audubon. Two solitary specimens of *D. brachyura*, Temm., were seen near the Straits of Fuca. I cannot agree with Mr. Cassin* when he says that "*D. nigripes* is only the young of *D. brachyura*." These species were never seen together, although thirty or forty of the Black Albatros were seen each day. Among the latter, occasionally specimens were noticed having a ring of white around the base of the tail. "*Diomedea nigripes* (Aud.):—Alar extent 84½ inches, length 31½ inches, bill 3·3 inches, tarsus 4·6 inches, wing 37·2 inches. Bill and entire body brownish black; legs black; base of bill whitish; white patches beneath the eye, and extending posteriorly for a short distance. Under wing-coverts lighter than rest of body; primaries with white shafts, shading towards tips into black, one dark brown." I am sorry that the voyage has been so meagre of natural-history results, but hope to be able to make up for it by researches in British Columbia and the Sandwich Islands.

3. Note on the Galago demidoffii of Fischer. By Dr. William Peters, For. Memb.

(Plate XXXV.)

G. Fischer† published, in 1806, a paper on a small *Galago*, which he named, in honour of the Chevalier de Demidoff, *Galago demidoffii*. Besides a plate representing the animal of the natural size, he gave the following very short description:—

"Elle a la grosseur d'une souris, des oreilles nues et une longue queue très-touffue. Son poil est roussâtre, son dessous grisâtre, et le cou noirâtre. Des poils très-longs, en forme de moustache, couvrent les coins de la bouche, les joues et le coin de l'œil."

Total length 2″ 2‴, tail 3″ 1‴, head 1″ 1‴, arms 1″ 5‴, legs 2″ 6‴, thigh 8‴, tibia 10‴, foot and tarsus 1″.

The specimen noticed by Fischer has not been examined by any later writer; and as in its size it more resembles the smaller species of Madagascar Lemurs (*Microcebus*, *Chirogaleus*, &c.) than the known species of *Galago*, it has ever been doubted whether it really belonged to the latter genus.

M. Temminck‡, describing in 1853 his *Otolicnus peli*, could not

* Illust. B. Calif. p. 210.

† Mémoires de la Société des Naturalistes de l'Université Impériale de Moscou, 1806, i. p. 24.

‡ Esquisses Zoologiques sur la Côte de Guinée. Leyde, 1853, 1ère partie, Mammifères, p. 42.



M & N Hanhart imp.

GALACO DEMIDOFFII.

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avoid perceiving the great resemblance between the young of his species and Fischer's *Galago demidoffii* from Senegal; and the only remarks he made against the identity of the two species are that Fischer had not mentioned the white stripe on the nose, and that he (Temminck) could not find on his species, "des poils très-longs, en forme de moustache, couvrant les coins de la bouche, les joues et le coin de l'œil," as noticed by Fischer.

That Fischer's *Galago demidoffii* really belongs to the genus *Galago* (*Otolicnus*), and not to *Microcebus* (the only genus that might be mistaken for it), there appears to be no doubt. For the figure given by Fischer shows a much more pointed, narrow snout, and a much longer tarsus, than is to be found in the genus from Madagascar.

The Berlin Museum has two stuffed specimens of *Galago peli*, an adult male and a very young one of the size of a mouse. The latter was determined and given by Temminck himself. They have the same long bristles in the face, not as described by Fischer, but as shown in his figure, on the side of the snout, above, in front, and behind the eyes; and the white, shady, defined streak on the nose of the adult male is more yellowish and much less defined in the young one. Besides this, all the species of *Galago* and *Microcebus* have the upper part of the nose white or paler than the surrounding parts. It appears to me therefore without doubt that Fischer's *Galago demidoffii* is only a young specimen of the *Otolicnus peli*, so well described by Temminck.

A third specimen, a young male, of this interesting and rare little animal, well preserved in spirits, which died in this Society's Gardens, has given me an opportunity of examining also its internal parts.





Mr. Wolf has made an excellent drawing of the living animal of the natural size (Pl. XXXV.), which, together with the two accompanying figures, will give an exact idea of its peculiar external form.

The number of teeth is, as I have also observed in immature specimens of other species, complete, which shows that also in this respect the Prosimii have much affinity with the Insectivora. The formula of teeth is $\frac{3\cdot3}{3\cdot3}\,\frac{1}{1}\,\frac{2-2}{4}\,\frac{1}{1}\,\frac{3\cdot3}{3\cdot3}$. The upper incisors are not lobated, and the true molars have no third internal series of tubercles, developed from the lingulum, as is observed in *Lemur* and *Microcebus*. The tongue has its point rounded, not entirely flattened, and sharp-edged as in *Lemur* and *Microcebus*. The viscera do not differ in any way from those of other species, as described at large in my work on the Mammalia of Mozambique, where I have also noted the remarkable difference that exists between the Lemurine animals from Madagascar and the other Prosimii, in the peculiar position of the *vesica follis*, which in the former has its basis turned towards the back.

4. On the Identification of the Hirundo esculenta of Linnæus, with a Synopsis of the Described Species of Collocalia. By Alfred R. Wallace, F.Z.S.

The small eastern Swifts which construct the edible nests have been separated by Mr. G. R. Gray as the genus *Collocalia*. For more than two hundred years they have attracted the attention of naturalists and travellers; yet up to the present time the species first described by Rumphius in 1750, and to which Linnæus gave the name of *Hirundo esculenta*, has remained quite unknown. Four or five other species of the genus have since been described, and specimens of all of these are more or less common; but though some of them have at various times been misnamed *esculenta*, it is I believe the general opinion of ornithologists that no specimen of the true Linnæan species is known to exist in European collections.

It is, therefore, with great pleasure that I bring before the Zoological Society specimens of this long-lost bird; for the description of Rumphius and the character of Linnæus are so clear and precise, that there can be no doubt whatever about the identification of the species. The whole bibliography of the subject has been so well worked out in Messrs. Horsfield and Moore's 'Catalogue of the East India Company's Museum' (Birds, i. pp. 99, 100) that I need do no more now than quote what is essential to prove my point. The oldest description of the bird, quoted by Linnæus, is that of Rumphius (Herb. Amb. vi. p. 183), who says, "*Ipsarum color plerumque niger est cum cæruleo fulgore, sique caudæ plumæ separentur, in quavis penna alba conspicitur macula.*" Linnæus says only, "*rectricibus omnibus macula alba notatis,*" which short character is, however, sufficient to distinguish the bird even now from the other species of the genus, all of which have the tail immaculate. My specimens all have these white spots on the tail; and they were obtained in various localities in and around the Moluccas, north, south,

east, and west of Amboyna, where Rumphius obtained his specimens. It is to be observed that these white spots are quite concealed, both on the upper and under view, by the overlapping of the feathers and the tail-coverts; so that, as Rumphius accurately describes it, "only when the feathers are separated, the white spots become visible." This circumstance, and the close general resemblance of the bird to the allied *Collocalia linchi*, Moore, which has no tail-spots, has led to this striking character being overlooked. It would appear that these two species are restricted to the Australian and Indian regions of the archipelago respectively, *C. linchi* extending from Java westward to the Nicobar Islands, while *C. esculenta* is found in Celebes and through the Moluccas to Timor and the shores of New Guinea.

It seems extraordinary that a bird which ranges over nearly half of the Malay Archipelago, and is by no means uncommon there, should not have been hitherto identified with the Linnæan species, as it is almost certain that specimens of it must exist in the museums of Leyden and other Continental cities. The fact may, however, probably be accounted for by the circumstance of one of the authorities most relied upon having been himself deceived in what he supposed to be the constructor of the edible nest of Java. M. Poivre furnished Buffon with a figure and description of a bird obtained at the place where nests were found on an island in the Straits of Sunda. This figure and description have been copied by Brisson, and have been mixed up with the description of the true *esculenta* by Gmelin and other naturalists. The locality, however, from which M. Poivre obtained his nests would show that they must have belonged to *C. linchi* or *C. fuciphaga*, and not to *C. esculenta*; while his figure proves that the bird he obtained was not a *Collocalia* at all—not even a Swift or a Swallow, but a short-winged, long-legged, straight-billed bird, agreeing in dusky colouring with *Collocalia fuciphaga*, but having the tail-feathers *white-tipped*. These extraordinary discrepancies, however, seem to have been generally overlooked; and the character given by Brisson, "*rectricibus nigricantibus, apice albis*," has been taken as agreeing with that of Linnæus, "*rectricibus omnibus macula alba notatis*;" whereas Rumphius (who is quoted by Linnæus) says that the feathers must be separated in order to see the white spots, clearly proving that they were situated towards the base, and not at the tip of the tail*.

In the British Museum collection there is a very beautiful species from the New Hebrides, having the white tail-spots as in *C. esculenta*, but with a narrow band of pure white across the rump.

I add a synopsis of what appear to me to be the well-authenticated species of this genus hitherto described.

* Since reading this paper, I have found that the late Prince Bonaparte had made the discovery of *Hirundo esculenta*, L. (Comptes Rendus, xli. p. 977), in 1855, from a Timor specimen in the Paris Museum, collected by Maugé in 1820. He notices the white spots towards the base of the tail. With this independent confirmation of my opinion, there can remain no doubt that the species is now satisfactorily determined.

1. COLLOCALIA ESCULENTA (L.), Rumph. Herb. Amb. vi. p. 183.

C. hypoleuca, G. R. Gray, Proc. Zool. Soc. 1858, p. 170.

Nigro-cærulea, subtus grisea et alba; rectricibus, mediis exceptis, macula alba basali notatis.

Long. al. 3¾ poll.

Hab. Celebes; Timor; Moluccas; Aru Islands.

2. COLLOCALIA LEUCOPYGIA.

"*C. linchi*, Horsf., et *C. troglodytes*, G. R. Gray," MM. Verreaux et Des Murs, Rev. et Mag. de Zool. 1862, p. 129.

"*Supra nigra, subtus albo-argentea, capite nigerrimo æneo micante, uropygio niveo.*"

"Long. al. 9·5 cent.=3⅔ poll."

Hab. New Caledonia.

Remark.—As this bird cannot possibly be either *C. linchi* or *C. troglodytes*, I am obliged to give it a new name. It may be the same as the species already mentioned, from the New Hebrides, in the British Museum.

3. COLLOCALIA LINCHI, Horsf. & Moore, Cat. Mus. E. I. Comp. i. p. 100.

Similis *C. esculentæ*, L., sed paullo obscurior et cauda immaculata.

Hab. Java; Malacca; Nicobar Islands.

4. COLLOCALIA SPODIOPYGIA, Peale, U. S. Expl. Exped. i. p. 176.

"*Tota fuliginosa, supra saturatior; uropygio tænia transversa lata cinerascenti-alba.*"

Long. al. 4½ poll.; caudæ 2¼ poll.

Hab. Samoan and Fiji Islands.

5. COLLOCALIA TROGLODYTES, G. R. Gray, Gen. of Birds, t. 19 (sine descr.).

Fusco-nigra, subtus fuliginosa, crisso albescente; tectricibus caudæ inferioribus et superioribus fusco-nigris; fascia uropygiali albida, rectricibus basi pallidis.

Long. al. 3¾ poll.; caudæ 1⅓ poll.

Hab. Malacca?; Philippine Islands? B.M.

6. COLLOCALIA FUCIPHAGA, Thunb. Act. Holm. xxxiii. p. 151. t. 4.

C. fuciphaga et *C. nidifica*, G. R. Gray, Gen. of Birds, i. p. 55.

C. esculenta, Horsf.

C. brevirostris, M'Clell.

C. unicolor, Jerd.

C. concolor, Blyth.

C. cinerea, Gm.; Cassin, U. S. Expl. Exped. p. 178.

C. francica, Gm. S. N. p. 1017.

"*Supra atra, subtus cinerea, tota immaculata.*"—Thunb.

Hab. Bourbon and Mauritius (var. *francica*, Gm.); India and

Ceylon; the whole of the Malay Islands; Louisiade Archipelago; New Caledonia; Tahiti (var. *leucophæa*, Peale; *cinerea*, Gm.); Marianne Islands.

Remarks.—This species has a very wide range, and varies much in size and a little in coloration. The females have a whitish band on the rump, which in old and worn specimens becomes more conspicuous. If that character exists in both sexes of *C. francica*, it may be considered a distinct species; but a specimen collected by Mr. E. Newton in Mauritius does not perceptibly differ from one of my females from the archipelago. The sexes differ in size, the females being the largest. I have both sexes from Macassar: wing of ♂ $4\frac{1}{10}$ inches, of ♀ $4\frac{1}{2}$ inches. The Indian specimens seem a little larger than this; those from Java smaller; while the Pacific Islands specimens, collected by the United States Exploring Expedition, are the largest of all, the wing being given as $5\frac{1}{8}$ inches. But as some Indian specimens which I have seen measure 5 inches, there is such a regular gradation that this character will not serve to divide the specimens. In accordance with the views of Bonaparte, I retain the original name of *fuciphaga* for this species, since, like that of *Paradisea apoda*, it is rather useful than otherwise, as indicating the erroneous opinions which were so long held as to the origin of the celebrated edible nests.

5. Notes on the Kagu. By Dr. George Bennett, F.Z.S.

On the 13th of June 1863, I received from New Caledonia, by H. I. M. Schooner 'La Calédonienne,' a pair of Kagus (*Rhinochetus jubatus*), male and female—one presented to me by Dr. Segol, the surgeon of the vessel, and the other obtained and sent to me by the kind exertions of M. Ferdinand Joubert, now residing in New Caledonia. Both these gentlemen have been indefatigable in endeavouring to procure living specimens, the value of which is much raised by the increased scarcity of Kagus on the island. The day following their arrival I placed them in the aviary in the Botanical Gardens. The female is a fine bird, and the largest specimen of the Kagu I have yet seen. It is graceful and elegant in appearance, active and lively in its habits, and its plumage in excellent condition. It is distinguishable from the male bird by its much larger size, and by the light colour of its plumage, also of its bill, feet, and legs. She has besides a peculiar habit of crouching on the ground and covering herself with her wings, by throwing them over together in a concave form, completely concealing the head and body. The male bird, on the contrary, throws up his wings alternately, as if using them as shields, and displays much pugnacity. The latter differs in colour from the female, his plumage being dark brown, with bars of a lighter shade; the primaries and secondaries of the wings are very dark brown, barred with black; the crest is also of a much darker shade of grey than in the female; the bill and legs are of a bright orange-red colour. When seen together, the male appears small compared

with the female. The latter utters a growling kind of scream; while the male makes a noise between a bark and a laugh, which is difficult to express in words, terminating in the oft-repeated note of *ōō, ŏŏ, ōō, ŏŏ*. The male bird is very lively, and readily attacks its aggressors. I regret to say that the male bird died on the 16th instant; but I have preserved its skeleton, and will forward it by an early opportunity to our friend Mr. Parker, as we have no skeletons of birds at present in our Museum at Sydney by which its affinities could be ascertained.

The Kagu is becoming very scarce in New Caledonia,—one cause of its rarity being that numbers have been shot for the table, these birds being excellent eating. It is now difficult to procure them dead, and still more so to take them alive. They are only found in one part of the island, about ten miles distant from the settlement of Port de France, where a gentleman told me he offered a large reward to the natives to procure one to take with him to France, but without success. The birds sent to me had been in the possession of private individuals for some time. The Kagus are easily domesticated, and, when captured, are placed in the poultry-yard with the fowls, where they soon become tame; but, as a matter of precaution, one of their wings is usually clipped. These birds are only met with about small marshes or ponds, feeding on worms, slugs, &c. The nest and eggs have not yet been discovered, although every exertion has been and is still being made by some of my resident friends in New Caledonia for that purpose.

6. On the Batrachians occurring in the Neighbourhood of Sydney, with Remarks upon their Geographical Distribution. By Gerard Krefft.

It must be interesting to every naturalist, and highly gratifying to Dr. Albert Günther, to learn that his estimate of the Batrachiofauna of the Australian region has not been exaggerated, and that the more we know of this fauna, the closer it appears to be allied to that of South America, as the learned Doctor first pointed out in his famous paper "On the Geographical Distribution of Batrachians." Dr. Günther, in summing up, places the Australian region, with regard to its richness of forms, at the head of his list,—namely, one species to every 33,000 square miles. This ratio will soon be realized, if not surpassed, as the following figures will show.

When Dr. Günther published his 'Catalogue of the Batrachia Salientia' in 1858, he enumerated twenty-six Australian species, seventeen of which have been observed by me in the neighbourhood of Sydney. My collection at the International Exhibition contained five new species (two new genera). Five other species, as yet undescribed, I have forwarded to Dr. Günther; and seven more are in my hands. If we go on discovering at this rate, we shall soon surpass in richness the South American, or rather the "Neotropical Region" of Dr. Sclater.

The following species occur in the neighbourhood of Sydney:—

LIMNODYNASTES DORSALIS.

Very rare. Found under stones in damp rocky ground during the cold season only. Occurs at Port Macquarie, Clarence River, and on the Lower Murray (Swan Hill), amongst the reed-beds, generally in old cattle-tracks or hoof-marks where moisture has accumulated. Nocturnal.

LIMNODYNASTES TASMANIENSIS.

Common near Sydney, on the borders of lagoons in summer; under logs and stones, often upon rocky ground, during the cold season. Deserted sandstone-quarries appear to be a favourite resort of this species. Young subjects vary in colour a good deal; they are often marked with a dorsal stripe, which probably disappears as they approach the adult age.

LIMNODYNASTES KREFFTII, Gthr.

Common. Of larger size than *L. tasmaniensis*, without black throat, but similar in habits and economy. A single specimen from Waroo, Port Curtis, is in my possession, showing an extensive geographical range. Nocturnal.

UPEROLEIA MARMORATA.

Common during the cold season, under stones; rare in summer. Nocturnal. The spots, which appear white in spirit specimens, are bright orange or yellow in the live subject. Feeds on small species of *Blatta*. Found on the Clarence River also.

PSEUDOPHRYNE AUSTRALIS.

Common on rocky ground only, in moist places, under stones, in particular in deserted sandstone-quarries. The male has a peculiar, sharp voice, which may be heard from 20 to 30 yards off. Females full of ova are taken as late as April, and many places abound now (May 22) with the tiny larva of this species. Seldom found in company with other Frogs. The beautiful red spots on the back and head in the live animal turn white in spirits. Nocturnal.

PSEUDOPHRYNE BIBRONII.

Common, representing the former species in the level and flat country. Similar in habits to *P. australis*; under logs and stones. Nocturnal.

LITORIA NASUTA.

LITORIA PUNCTATA.

LITORIA MARMORATA.

These three species occur near Sydney, but are perhaps varieties

of *L. nasuta* only. Specimens in different stages of growth, and differing considerably in coloration, &c., have been forwarded to Dr. Günther for examination. In all the specimens, the first finger is opposed to the others. The members of this genus are true Jumping Frogs, often bounding as high as one's head—the Kangaroos amongst the Batrachians. They inhabit grassy moors and swamps, seldom, if ever, rocky ridges, and when chased are apt to entice their pursuer into quagmires. They are diurnal in their habits—often basking on the leaves of Banksias, in a burning sun, watching for insects. I observed large numbers of young ones, in the beginning of March, which had just emerged from the larva state, and were almost as plentiful as grasshoppers, on the sandy flats towards Botany Bay. I noticed not a single half-grown or adult specimen.

HYLA AUREA.

All the species of *Hyla* which Dr. Günther enumerated in his Catalogue in 1858 are found near Sydney, *Hyla rubella* excepted. *Hyla aurea* is the most common of all the Australian Frogs, being found in every lagoon or stream of water, and furnishing food to the Black Snakes, which swallow this *Hyla* as a gourmand does an oyster. I have watched a *Pseudechis* taking in fifteen frogs one after the other, after which the aggressor was conveyed into my collecting-bag. Of a hot summer's evening their loud, rolling, quacking noise may be heard for miles; now (May) it has entirely ceased. During the cold season this frog retreats to the high ground, seeking shelter under rocks and stones; but many bury themselves in the mud.

This species is very voracious, feeding upon almost any Batrachian, no matter what, as long as it can be swallowed. I have seen them devour Lizards and large *Blattæ*; in fact, nothing appears to come amiss to them, if hungry. The natives eat this species: returning unsuccessful from the chase at night, they light some boughs and catch frogs. Hundreds may be gathered by the light of a fire, —a fact of which poor Burke and Wills do not appear to have been aware when starving on Vardoo at Cooper's Creek. This species has an extensive geographical distribution, and is found in almost every part of the Australian continent and Tasmania. But west-coast specimens differ from those in this neighbourhood in having a tubercular back, and almost always a rather broad vertebral line from the top of the snout to the vent.

HYLA CITROPUS.

This rare species has been observed in winter-time only, when I have found it under stones in creek-beds, always upon elevated rocky ground, never in the plains. It grows to a considerable size, and, I believe, frequents the high branches of the *Eucalypti* during the summer. A fly often deposits its eggs close to the tympanum of *H. citropus*, and the larva lives there until ready for transformation into the chrysalis state, when it drops out, looking similar to a large yellow maggot. It then forms a black covering, attaches itself to the

under side of a rock or stone, and emerges in course of time as a perfect insect. Whenever I have squeezed the larva out, it has invariably caused the death of the Frog. I know nothing of the geographical distribution of this species, not having received specimens from other parts of the country.

Hyla peronii.

Tolerably common. Frequently found under the loose, moist, paper-like bark of the Tea-tree (*Melaleuca*?). The bright yellow covering of the legs is soon lost in spirits. Like most Frogs, *H. peronii* has the power of changing colour; and on a hot sunny day, basking on some broad-leaved plant, it looks almost white.

The present species appears to be distributed over almost every part of the continent, from Tasmania to Port Essington. Specimens from Port Macquarie, the Clarence River, Brisbane, Port Curtis, and Port Denison are in the collection of the Australian Museum at Sydney.

Hyla ewingii.

This pretty little *Hyla* is rather a rare species, and I do not think that I ever found more than six or eight specimens of it, generally under stones during the cold season. Dr. Günther mentions it as occurring in Tasmania and North-eastern Australia.

Hyla servesiensis.

Common near Sydney, in deep rocky places between ferns; in fact almost all my specimens were taken from between fern-clusters. A constant visitor in "hothouses" at the Botanical Gardens, and a great expert in the art of catching flies. I am unable to give an account of the geographical range of this species.

Hyla verreauxii.

A rather rare Frog, which I have occasionally taken from under the bark of the Tea-tree, and from under rocks in moist localities; never taken during the summer. No specimens from other parts of Australia have as yet come under my notice.

Hyla krefftii, Gthr.

A very common species all over the eastern part of Australia. Well known to every colonist on account of its shrill singing noise, which almost resembles that of a Grasshopper; and yet very few persons have seen this Frog, as it frequents the high trees at night, and sleeps under the bark during the daytime. Before and during rain, thousands of these little creatures begin to whistle, producing a most deafening noise, and puzzling every "new chum" who listens to such a concert for the first time. During protracted dry weather little or nothing is seen of this Frog; but after the ground has become thoroughly saturated, and pools have been formed under the high trees, this species may be observed in thousands, in company

with *Hyla aurea* and *Pelodryas cærulea*. The specimens I have kept for observation are constantly changing colour, being dark during the daytime, and almost white at night.

PELODRYAS CÆRULEA.

This Giant Tree-Frog is widely distributed over almost every part of Australia, and, on account of its frequenting waterspouts and taking up its quarters under the shingles of roofs, may be considered quite a domestic animal. I have seen young ladies nearly go into hysterics when on a sultry summer's night the deep croak of this large Batrachian sounded from various corners of the roof—particularly when, after an unsuccessful attempt at catching some moth, it has fallen with an uncomfortably dull noise upon the floor of the verandah. *P. cærulea* is a most voracious feeder, and, like *Hyla aurea*, devours all the other Frogs and its own immature kindred. In its habits it is also nocturnal, though now and then a stray specimen may be seen during the daytime.

There are several species of Batrachians of the genus *Hyla* and *Cystignathus* as yet undescribed; so that the number of Frogs found in this neighbourhood may be fairly estimated as twenty distinct species.

7. NOTES ON THE SEBASTOID FISHES OCCURRING ON THE COAST OF CALIFORNIA, U. S. A. By WM. O. AYRES, M.D., C.M.Z.S.

A remarkable feature in the ichthyic fauna of the coast of California is the occurrence of a large number of species belonging to the old genus *Sebastes*. They are taken in great quantities, and, being all of excellent quality for the table, they furnish a large proportion of the fresh fish sold in the markets of San Francisco. The different forms are readily distinguished by the fishmongers, though they sell them all under the absurd name of "Rock Cod." Their ichthyological history may be thus recorded.

In August 1854, *Sebastes auriculatus*, Gir., *S. rosaceus*, Girard, and *S. fasciatus*, Gir., were published in the 'Proceedings of the Academy of Natural Sciences of Philadelphia.' A few weeks later (in September), before the Philadelphia publication reached California, *S. nebulosus*, Ayres, *S. paucispinis*, Ayres, *S. ruber*, Ayres, and *S. ruber*, var. *parvus*, Ayres, were named in the 'Proceedings of the California Academy of Natural Sciences;' and in the same paper I indicated another species as perhaps *S. variabilis*, Cuv. Of these, *S. nebulosus* is identical with *S. fasciatus*, Gir. (but as the name *fasciatus* had been preoccupied by Dr. Storer for a species of Massachusetts Bay, *nebulosus* must be retained for the Californian species); *S. ruber*, var. *parvus*, is *S. auriculatus*, Gir. In November 1854, *S. nebulosus*, *S. paucispinis*, *S. ruber*, and *S. variabilis* were mentioned again by me in the 'Proceedings of the Boston Society of Natural

History.' In 1856 the species referred to by me under Cuvier's name *variabilis* was described by Girard as *S. melanops* (Proc. Acad. Nat. Sci. Phil. viii. p. 135). In 1858, in the tenth volume of the 'Pacific Railroad Reports,' Girard described all the species as he then understood them, giving my *S. ruber* as a synonym of his *S. rosaceus*,—an error on his part, since the two species are entirely distinct. In October 1859, *S. nigrocinctus*, *S. helvomaculatus*, and *S. elongatus* were described by me in the 'Proceedings of the California Academy of Natural Sciences.' Of these, *S. helvomaculatus* is considered by Mr. Theodore Gill (Proc. Acad. Nat. Sci. Phil., June 1862) as merely a synonym of *S. ocellatus*, Cuv. In 1861, Mr. Gill (Proc. Acad. Nat. Sci. Phil., July 1861) proposed to separate *Sebastes paucispinis* from the other species, under a new generic name, *Sebastodes*. In 1862 (Proc. Acad. Nat. Sci. Phil., June 1862) the same author proposed to include all the other Californian species in a new genus, to be designated *Sebastichthys*. In January 1863 (Proc. Cal. Acad. Nat. Sci. ii. p. 209) I described two new species, *Sebastodes flavidus* and *S. ovalis*. At the same date (*op. cit.* p. 211) I gave a brief sketch of what I believed to be the correct synonymy of the species now known on the coast of California.

Such has been, in brief, the series of notices and publications relating to these fishes. We have thus eleven species, all of which were (or would have been) until recently designated as *Sebastes*. A careful investigation of them all, with examination of very numerous specimens, has, however, convinced me that they must be arranged in two generic groups; and inasmuch as two generic names have, as above stated, been proposed for them by Mr. Gill, it is well to consider whether these names truly represent the two groups as seen in nature.

Of *Sebastodes* he gives the following diagnosis:—"This genus is framed for the *Sebastes paucispinis* of Ayres. It has a very different facies from *Sebastes*, and is readily distinguished by the longer body, the very protuberant lower jaw (which has a symphysial swelling beneath), the minute scales, the form and armature of the head, the deep emargination of the dorsal fin, and the emarginated caudal." Such a grouping of characters as this belongs only to the single species, *S. paucispinis*. In the ratio of depth to length we have every step, from the "longer body" of *S. paucispinis* and *S. elongatus* (which two are of about equal slenderness, though in other respects they differ widely) to *S. ovalis* and *S. nigrocinctus*. And I may here take occasion to remark that the practice, in describing fishes, of giving the ratio of depth to length with such minuteness as is the custom of some writers, has no warrant in nature, since different individuals of the same species vary widely in their relative depth; and not only so, but the same individual varies widely at different times, according to the abundance or scarcity of food, and from other causes. The "emargination of the dorsal fin" is most decided in *S. flavidus*, while the least emargination of all occurs in *S. elongatus*, and the next to that is in *S. ovalis*, which latter, however, is most closely allied to *S. flavidus*. The "emarginated caudal" is a feature so slightly marked

at the best, and disappears so gradually from one species to another, as to be of very little value. It is greatest in *S. paucispinis* and *S. elongatus*, and becomes less through *S. ovalis*, *S. flavidus*, *S. melanops*, *S. rosaceus*, and *S. helvomaculatus*; in *S. ruber* and *S. auriculatus* the fin is about even, and in *S. nebulosus* and *S. nigrocinctus* it is slightly rounded. The "protuberant lower jaw" and its "symphysial swelling beneath" are of greater value as generic features; they are common to five of our species. These five have the lower jaw (which is knobbed at its extremity) continuing nearly the line of extension of the top of the head; in these five the top of the head is smooth and unarmed. In the remaining six species the two jaws are but little unequal, and the lower is blunt and does not continue the line of extension of the top of the head; in these six the top of the head is strongly ridged and spinous. But when we look at the species of other waters, we find that the relative development of the jaws can scarcely hold such rank as our groups here would seem to indicate. *Sebastes viviparus*, for instance, with the surface of the head very rough and spinous, has the knobbed projection of the lower jaw strikingly developed. The "minute scales" belong only to *S. paucispinis*. It does not seem possible, therefore, that *Sebastodes* can be retained with such limits as were assigned to it by Mr. Gill.

Let us now turn to his definition of *Sebastichthys*. He assigns as its characters "eleven to twelve (XI.+I.—XII.+I.) spines in the first dorsal fin, palatine teeth, and the physiognomy of *Sebastes* (*norvegicus*)." But all of our species, *S. paucispinis* included, have the same number of spines in the first dorsal fin—thirteen, or, if a division is preferred, XII.+I.; and all are furnished with teeth on the palatines. Neither can the "physiognomy" be deemed of value, inasmuch as forms so very unlike are here gathered into one group: the rough, blunt-headed *S. nigrocinctus* has little kindred in features to the smooth, sharp-nosed *S. melanops*. And as *S. norvegicus* itself is provided with palatine teeth, the only character remaining to separate *Sebastichthys* is the number of first dorsal spines. This unsupported, does not appear sufficient.

The divisions of our Californian species, therefore, which have been proposed by Mr. Gill I cannot adopt, though one of his names may be retained with a different limitation.

Of the two groups which, as before stated, I find to exist in our waters, one has the top of the head rough, the other has it smooth. The former I refer without hesitation to the genus of which the common species of Massachusetts Bay, *S. viviparus*, is a member; and, since Cuvier in his original diagnosis separates *Sebastes* from *Scorpæna* in consequence of the absence of fleshy filaments on the head, it seems most natural in making a division of his genus that the name *Sebastes* should be retained for those which, like *Scorpæna*, have the top of the head rough with ridges; and I propose thus to restrict it. For the other group (those with the head smooth) a distinct generic name is needed; and since the appellation *Sebastodes* has been proposed for one of the well-marked species, it seems better

to apply that to the entire group than to introduce a new term. I suggest, therefore, the following arrangement:—

Gen. SEBASTES.—*With the characters of* Sebastes *as given by Cuvier, except that the top of the head is always marked by spinous ridges, the orbits being commonly crested, so as to leave a depression between them.*

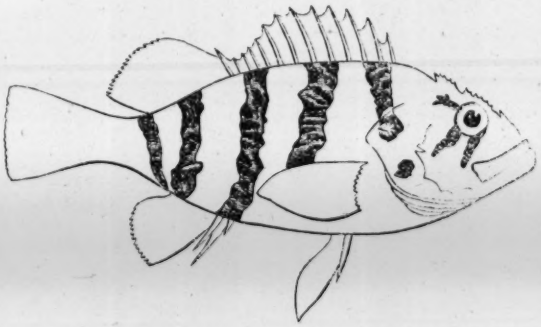
Gen. SEBASTODES.—*With the characters of the typical* Sebastes, *except that the top of the head is always smooth, the spinous ridges being so little developed as to be barely discernible, the orbits not elevated.*

In what manner the species of other waters should be distributed under this division I do not purpose at present to specify. The means of reference to original authorities are here, unfortunately, so small as to make the attempt useless. The Californian species, however, hitherto discovered may be arranged and designated thus:—

1. SEBASTES NIGROCINCTUS, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 25, and p. 217, fig. 67.

Sebastichthys nigrocinctus, Gill, Proc. Phil. Acad. Nat. Sci. 1862, p. 278.

This is more strongly marked in the generic features than any other of our species. The spines of the top of the head are very prominent; the nasal spines strong, while nearly continuous from them are a pair of slender interorbital ridges; the supraorbital crest



sometimes a single ridge, and sometimes a series of spines or tubercles; posterior to these a row of blunt tubercles, extending across the top of the head, varying in number from two to five or six; posterior to these the occipital ridges, very high, and commonly not terminating in a spine. The posterior suborbital terminates in a distinct spine. The preopercular spines are less prominent than in most of the species, consisting of two, or at most three, on the posterior border, with one or two rounded but not spinous projections beneath. The humeral suprascapular and two opercular spines are

of moderate development. The spinous and soft dorsals are about equal in height, the spinous rays quite stout. The second anal spine is higher and stronger than the third.

The colours in this species are entirely characteristic, and very strongly marked. The fish is of a plain reddish yellow, crossed by five to six very distinct, nearly vertical, broad, dark bands, with commonly two or three similar bands from the eye, one upward and backward, and the others downward and backward. These bands in my original description were said to be black, and the specific name was given with that understanding. But I have since that time seen specimens in which the bands were of a dark reddish brown when fresh from the water, and became black only on the drying of the surface or on immersion in alcohol.

S. nigrocinctus is not at all common in our waters, many months often passing without a specimen being taken. It seldom exceeds two pounds in weight.

2. SEBASTES NEBULOSUS, Ayres, Proc. Cal. Acad. Nat. Sci. i. p. 5.

S. fasciatus, Gir. Proc. Phil. Acad. Nat. Sci. 1854, p. 146, and P. R. Rep. x. p. 79, pl. 22 (non *S. fasciatus*, Storer, Proc. Bost. Soc. Nat. Hist. v. p. 31).

Sebastichthys nebulosus, Gill, Proc. Phil. Acad. Nat. Sci. 1862, p. 278.

In this species the spines of the top of the head are less prominent than in *S. nigrocinctus*. The nasal and anterior supraorbital are sharp, rather strong; the posterior supraorbital a smooth prominent ridge, ending in a strong spine; the intraorbital space smooth, not ridged as in *S. nigrocinctus*; postorbital spine sharp and strong; occipital spine a long smooth ridge, prominent, but not near so high as in *S. nigrocinctus*, and ending in a sharp spine; no spines on the suborbitals; humeral, scapular, and opercular spines flat, and not prominent; preopercular five, well developed, rather sharp, the two on the lower border more blunted. Spinous dorsal much higher than the soft; second anal spine higher and stouter than the third.

The colours are sufficiently well stated by Girard (*loc. cit.*). *S. nebulosus* is by no means rare, and is found in the markets of San Francisco at all seasons, seldom exceeding two pounds in weight.

3. SEBASTES AURICULATUS, Gir. Proc. Phil. Acad. Nat. Sci. 1854, and P. R. Rep. x. p. 80.

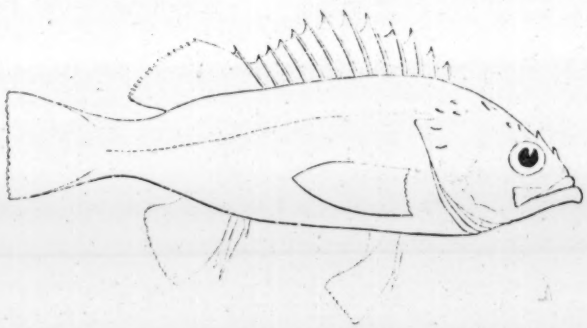
S. ruber, var. *parvus*, Ayres, Proc. Cal. Acad. Nat. Sci. 1854, i. p. 7.

Sebastichthys auriculatus, Gill, Proc. Phil. Acad. Nat. Sci. 1862, p. 278.

Sebastes auriculatus, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 218, fig. 68.

All the spines of the top of the head regular, smooth, strongly marked, but not very prominent. Nasal stout and sharp; anterior

and posterior supraorbitals strong and sharp, but not so elevated as to make much depth to the intraorbital fossa; intraorbital ridges just discernible; postorbital spine slender, very sharp; occipital ridge smooth, somewhat prominent, not spined. Upper two preopercular spines sharp, next two flattened and serrated or edged, anterior one blunt. Humeral, scapular, and two opercular spines flat, not prominent; lower angle of operculum serrated. Spinous dorsal a little higher than the soft portion, or sometimes only equal. Second anal spine as high as the third, and stouter.



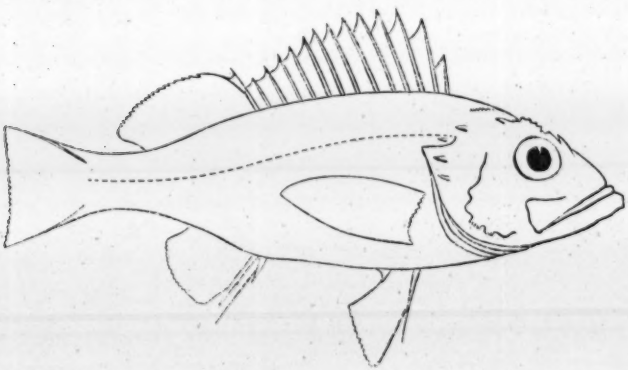
The colours are stated with sufficient accuracy by Girard (*loc. cit.*). *S. auriculatus* is perhaps the most common species we have, and is almost the only one taken about the wharves of the city. The examples for the most part small, seldom exceeding half to three-quarters of a pound in weight, though those brought in by the fishermen from the deep water are much larger; the heaviest I have seen was 20 inches long, with a weight of six pounds. In the large specimens the black spot of the operculum becomes almost obsolete.

The typical specimens of *S. nebulosus* and *S. auriculatus* are quite widely distinct; but so many intermediate forms occur, that not unfrequently it is actually very difficult to decide to which of the two certain individuals should be referred. The spines and ridges of the head I have found more reliable as means of diagnosis than any other features.

4. Sebastes ruber, Ayres, Proc. Cal. Acad. Nat. Sci. i. p. 7, and ii. p. 208, fig. 63 (non *S. rosaceus*, Gir. P. R. Rep. x. p. 78).

Top of the head quite rough, the ridges being thinner and more irregular on their edge than in the other species. Nasal spine sharp and rather strong; supraorbital crest consisting of an anterior spine which is distinct and regular, and then an elongated irregularly serrated ridge, not ending in any very distinct spine; postorbital spine not large, but quite sharp, distinct, and regular; intraorbital pair of

ridges low and not much crested, but quite discernible; occipital ridge long, about as high as in *S. nebulosus*, irregularly serrated, and not ending in any very distinct spine; the upper two preopercular spines rather sharp, the next two flattened and serrated on the end, the anterior one blunt; opercular spines flat; humeral and scapular small. Second and third anal spines about equal in height and size. Spinous dorsal higher than the soft portion. Posterior margin of the caudal nearly even. Colour nearly uniform light crimson, lighter beneath.



This is the species described by me in 1854 (*loc. cit.*), but is not the one to which the name is referred by Girard (P. R. Rep. x. p. 78) as a synonym of *S. rosaceus*. The two have little close resemblance, except in colour. The points of difference will be given when speaking of *Sebastodes rosaceus*.

S. ruber is not at all rare. It grows to decidedly a greater size than any of the other species, reaching occasionally a weight of twenty-five pounds, and, as the fishermen assert, even greater still, while those of from ten to twelve pounds are quite common.

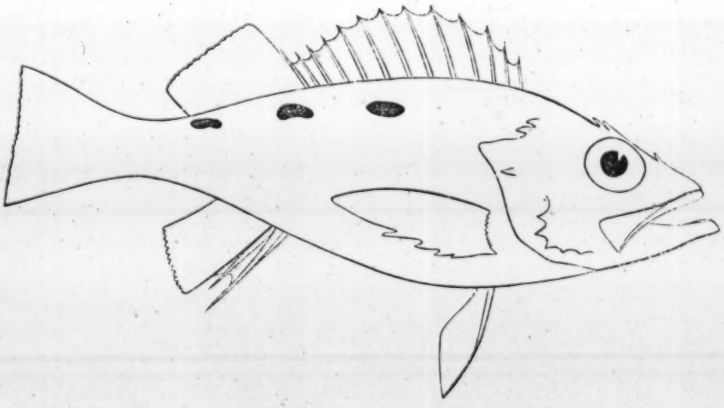
5. SEBASTES HELVOMACULATUS, Ayres, Proc. Cal. Acad. Nat. Sci. 1859, ii. p. 26, fig. 8.

S. ocellatus?, Cuv. (*fide* Gill, Proc. Phil. Acad. Nat. Sci. 1862, p. 278).

Sebastichthys ocellatus, Gill (*loc. cit.*).

Upper surface of the head quite strongly ridged. Nasal and anterior supraorbital spines sharp, quite prominent; posterior supraorbital forming a crest, which ends in commonly two prominent sharp spines; intraorbital fossa well marked, with two intraorbital ridges; postorbital spine appearing like a continuation of the posterior supraorbital, prominent, very sharp; occipital ridge somewhat

elevated, ending in a free spine; of the preopercular spines, the upper two are well developed, not very sharp, the lower three forming blunt projections; two opercular spines sharp, not very long. Humeral and scapular somewhat prominent. Spinous dorsal a little higher than the soft portion. Second anal spine higher than the third, and much stouter.



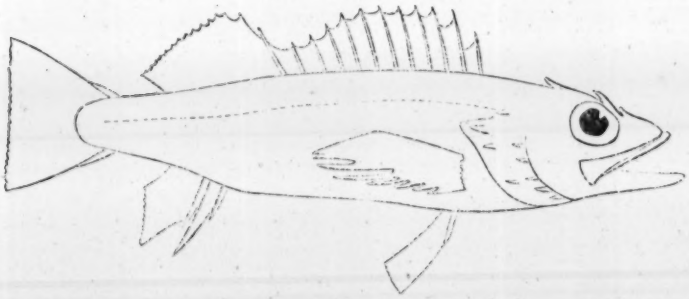
Colour pale red, becoming lighter beneath, with several light-pink spots on the upper parts of the sides. These spots are commonly three, though occasionally one or two additional irregular ones are seen. Sometimes in the largest specimens the light red of the ground-colour is variegated with numerous minute whitish specks.

The outline figure (given above) represents the projection of the lower jaw a little more strongly marked than it should be; and shows also but the lower of the two opercular spines, giving instead one too many on the præoperculum. Otherwise, though rough, it is tolerably characteristic.

S. helvomaculatus is not by any means rare, being brought to the markets of San Francisco in some numbers. They are commonly small, not exceeding a pound in weight, though specimens weighing three to four pounds are sometimes seen. This species has been referred by Mr. Gill (*loc. cit.*) to the South American form described by Cuvier, *S. ocellatus*. The identification may perhaps be correct, for the two doubtless approach each other closely; but the difference in proportions, in the spines of the head, and in the colouring of the fins, and the wide separation in localities, together with the fact that no specimens have been brought to me among numerous collections made on this coast south of Point Conception, have induced me to retain, at least for the present, the name given to our northern species.

6. SEBASTES ELONGATUS, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 26, fig. 9.

Nasal spine sharp, quite prominent; anterior supraorbital well marked, sharp; posterior supraorbital forming a crest quite sufficient to leave an intraorbital fossa, and terminating in a sharp spine; postorbital just discernible; occipital ridge smooth, low, with a free point. Opercular, preopercular, humeral, and scapular spines prominent and sharp. Inferior angle of operculum and posterior angle of suboperculum spinous. Second anal spine higher and much stouter than the third. Spinous dorsal about equal in height with the soft portion.



S. elongatus is readily distinguished from all the other species of true *Sebastes* by its extreme slenderness, in which respect it closely resembles *Sebastodes paucispinis*, sometimes even surpassing it. The proportion of depth to length varies from about one-fifth to nearly one-fourth. The figure (given herewith) represents the first specimen found, which was as slender as any I have seen. In the figure a spine is inadvertently shown on the lower part of the operculum, while the scapular is omitted; the knobbed projection of the lower jaw is not sufficiently indicated. The colours are well stated in the original description.

The species appears to be not at all common, few being brought to the markets. They seldom exceed a pound in weight.

SEBASTODES.

In the species of this division no diagnostic characters can be drawn from the spines of the head, as so little difference is found in them. In all, the nasal, supraorbital, and occipital spines are barely discernible, or cannot be traced at all; the five preopercular are quite strongly developed, smooth, and sharp (except that in *S. paucispinis* the lower one is a blunt projection, with one, and sometimes two sharp points); the opercular two are long and sharp; the hu-

meral and scapular are almost concealed. The specific distinctions, therefore must be drawn from other features. The species may be arranged and defined as follows:—

1. Sebastodes paucispinis.

Sebastes paucispinis, Ayres, Proc. Cal. Acad. Nat. Sci. i. p. 6; Gir. P. R. Rep. x. p. 83, pl. 22 A.

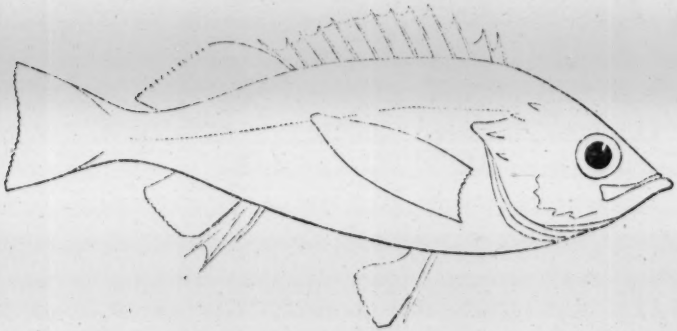
Sebastodes paucispinis, Gill, Proc. Phil. Acad. Nat. Sci. 1861, p. 165.

This species is quite elongated in form, its depth being about one-fourth of its length. The spinous dorsal is arched in outline, the emargination between it and the soft portion being very distinct, though less strongly marked than in *S. flavidus* or *S. melanops*. The head is longer than in most species, constituting fully one-third of the entire length. But the feature by which *S. paucispinis* is at once recognized is the "small scales." They are relatively less than in any other known species, and are accompanied by a general softness of flesh, which causes the fish to be less esteemed for the table than any other of the group found in our waters. The description and figure given by Girard are tolerably accurate.

S. paucispinis is not by any means common in this vicinity. It is taken in company with the other species; but no more than a single specimen at long intervals is seen in the markets. It attains a length of 25 to 28 inches.

2. Sebastodes ovalis, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 209, fig. 65.

This species is much stouter than *S. paucispinis*, its depth being nearly one-third of its length. Its closest alliances are with *S.*



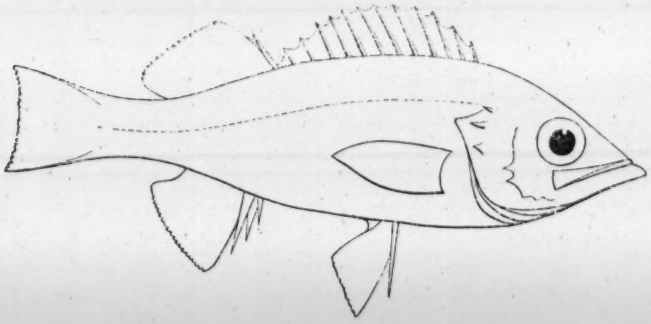
flavidus, Ayres, and *S. melanops*, Gir. The spinous dorsal decreases but little in height posteriorly, leaving of course but a slight emargination between it and the soft portion, which latter is low, its height

being less than half its length. The pectoral fins are large, their height being about one-fourth the length of the fish. Of the three spines of the anal fin, the second is the highest and stoutest, equalling the height of the soft portion of the fin. In colour the fish is of a dark greenish brown above, becoming yellowish green on the sides, and still lighter beneath. In regard to the softness of the scales it comes nearer than any other species to *S. paucispinis*, though they are relatively much larger than in the latter.

S. ovalis appears to be quite rare, only a few specimens having been seen. None have exceeded three pounds in weight.

3. SEBASTODES FLAVIDUS, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 209, fig. 64.

This species is so closely allied to *S. melanops*, Gir., as scarcely to be distinguished from it, except by its colours. *S. melanops* is nearly black above, lighter on the sides and beneath; while *S. flavidus* is like *S. ovalis*, "dark greenish brown above, becoming yellowish green on the sides, and still lighter beneath."



S. flavidus is by no means uncommon, being brought to the markets in abundance. It seldom exceeds two pounds in weight.

4. SEBASTODES MELANOPS, Gir.

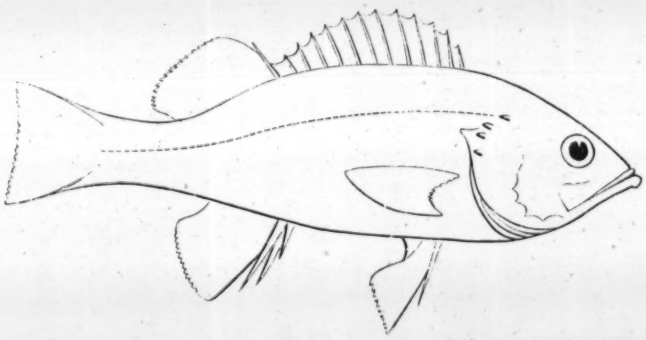
Sebastes melanops, Gir. Proc. Phil. Acad. Nat. Sci. viii. p. 135; and P. R. Rep. x. p. 81.

Sebastes variabilis, Ayres (non Cuvier), Proc. Cal. Acad. Nat. Sci. 1854, i. p. 7.

Sebastodes melanops, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 211, fig. 66.

This species is sufficiently well described by Girard (*loc. cit.*); but inasmuch as no figure is given by him, reference may be made to the outline illustration given herewith (p. 401), which is accurately reliable.

S. melanops is quite common here, and is brought to the markets in large numbers. It is generally small, not exceeding a pound in

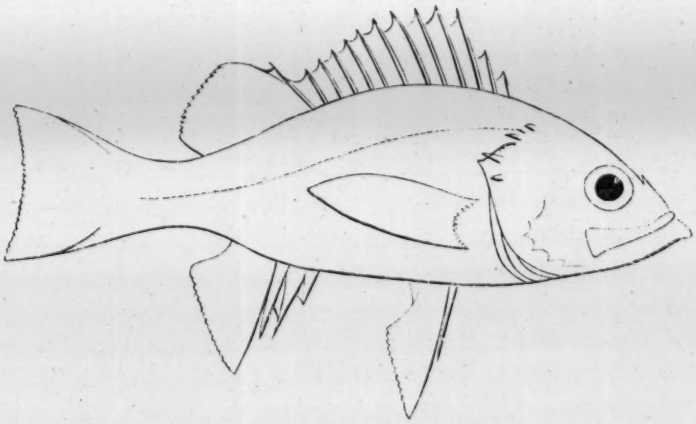


weight, though it occasionally attains a weight of three or four pounds.

5. SEBASTODES ROSACEUS, Gir.

Sebastes rosaceus, Gir. Proc. Phil. Acad. Nat. Sci. viii. p. 146; and P. R. Rep. x. p. 78, pl. 21 (non *Sebastes ruber*, Ayres, Proc. Cal. Acad. Nat. Sci. i. p. 7).

Sebastodes rosaceus, Ayres, Proc. Cal. Acad. Nat. Sci. ii. p. 206, fig. 62.



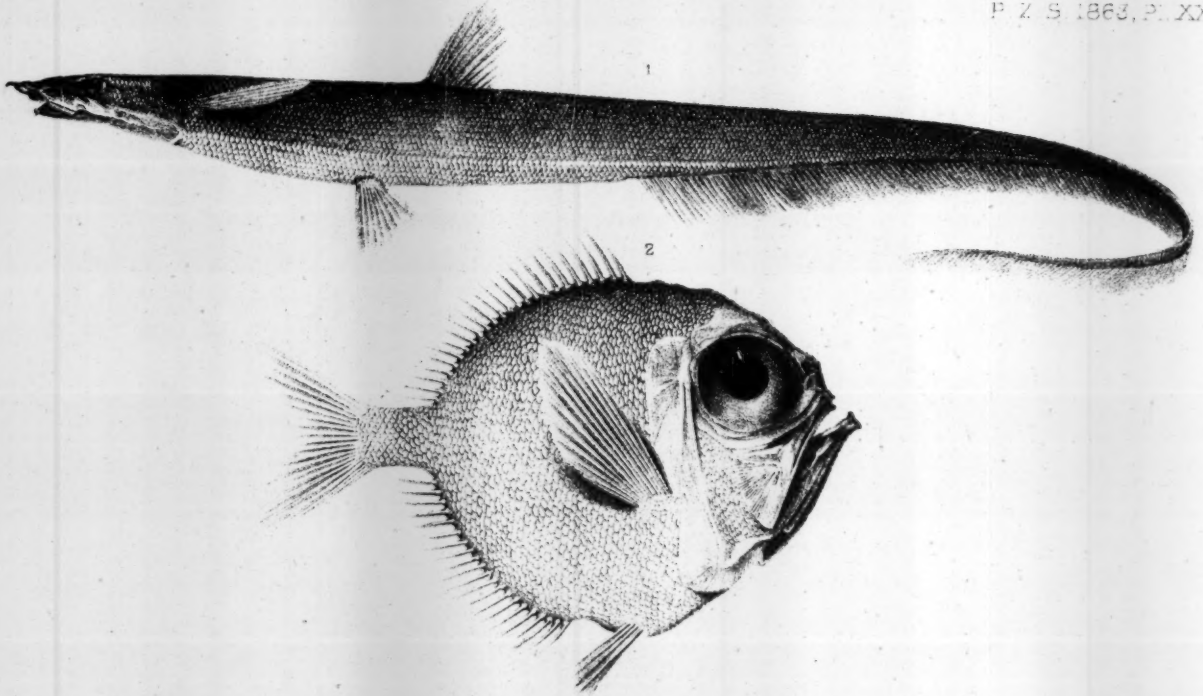
This is the species originally described by Girard (*loc. cit.*) under the name *rosaceus*, and again quite correctly in the tenth volume of the 'Pacific Railroad Reports.' In this latter publication he incorrectly refers my *Sebastes ruber* to it as a synonym. The two are widely distinct: *S. ruber* has the top of the head strongly ridged and spinous, as already stated in this present communication; *S. rosaceus*, as its generic affinities indicate, has the same region almost entirely smooth, the nasal and occipital spines being barely discernible: in *S. ruber* the preopercular spines are blunt, almost truncated; in *S. rosaceus* the same spines are long and very sharp: in *S. ruber* the anal fin is small and rounded, its height being only about one-eighth of the length of the fish, while the second and third spines of the fin are nearly as high as the soft portion; in *S. rosaceus* the same fin is much larger and pointed, its height being more than one-sixth of the length of the fish, while the third anal spine (which is higher than the second) is only about half as high as the soft portion. Many other points might be noticed, but these are sufficient. The outline figures show very clearly the relations of the two species.

Sebastodes rosaceus is quite common. It is a smaller fish than *Sebastes ruber*, seldom exceeding five or six pounds in weight.

In the preceding notices, of course no attempt has been made to give a full description of each or any of the species; nor has any comparison between our species and those of other waters been instituted; for the means necessary for such a comparison are not at hand. But sufficient points have been noted to identify, as it is hoped, the forms to which the names here adopted are applied.

The eleven species thus indicated are brought to the markets of San Francisco at all times of the year, the fishery being little affected by the seasons. They are taken with the hook, in the open sea, near the Bay of San Francisco, wherever rocky bottom is found. One species only, *Sebastes auriculatus*, is caught about the wharves of the city. The spawning-season is from March to June; and in all the species the development of the young takes place within the body of the mother, but to what degree I have not yet the means of stating with absolute accuracy. I have traced them to such a stage of advancement that the mouth, the intestinal canal, the vertebral divisions, and the vertical fins were all plainly discernible, and of course the eyes strongly marked and prominent, the embryo on being removed from the egg being fully half an inch in length.

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J. Jury lith.

M& N Hanhart, Imp.

Fig 1. HALOSAURUS OVENII.
2. DIRETMUS ARGENTEUS.

8. Descriptions of Three New Genera of Marine Fishes obtained at Madeira. By James Yate Johnson, Corr. Mem. Z. S.

(Plate XXXVI.)

Order ACANTHOPTERYGII.

Fam. Carangidæ, Günther.

Diretmus, gen. nov.

Body much compressed and elevated, covered with small spinous scales. Abdomen prominent and keeled. Mouth large, non-protractile; minute pointed teeth in the jaws, none on the palate; a pair of large tooth-like bony processes projecting from the anterior ends of the maxillaries, and entering the mouth between the vomer and the premaxillaries. Head, opercular pieces, and mandibular bones bearing numerous thin bony crests. Eyes large. A single dorsal fin commencing about the middle of the body over against the anal fin, both being continuous. Perfect thoracic ventral fins, with a free bony appendage at the upper angle of their roots. Pseudobranchia present. Branchiostegal membrane with seven rays. No lateral line.

The small but highly interesting fish upon which this new genus has been established appears to be allied to fishes belonging to genera some of which have been placed by Dr. Günther amongst the *Scombridæ*, others amongst the *Carangidæ*—families distinguished by him on account of differences in the number of the vertebræ. I have been unwilling to open the single specimen obtained with a view to the determination of this point, but place the genus provisionally amongst the *Carangidæ* on account of its many resemblances to *Antigonia*. It may be entered in the synopsis of the genera of that family (Cat. Brit. Mus. Coll. p. 418), in sect. β of the first group, *Carangina*, thus:—

Ventrals with a free bony appendage.

These appendages, the tooth-like processes of the maxillaries, and the crests about the head present an assemblage of characters quite sufficient to separate this form distinctly from all other known Acanthopterygian genera.

Diretmus argenteus, sp. n. (Pl. XXXVI. fig. 1.)

D. 27. A. 22. P. 18. V. 10? C. 19. M. B. 7.

The body is much compressed, and so elevated that without the tail and its fin it is subcircular. The height to the total length is about 1 to $1\frac{2}{3}$. The abdomen is prominent and keeled, and the nape is trenchant. It is of a silvery-grey colour, with darker grey near the dorsal and anal fins. The skin, when the scales are removed, is fuscous. The whole body is clothed with small, somewhat deciduous scales, having four or five broad teeth at the edge and some minute spines on the exposed surface. Each scale is constricted at the middle; the posterior portion is rather larger than the anterior,

and marked with curved transverse striæ. The *head* is large, being contained in the total length only about $2\frac{2}{3}$ times. It is remarkable for the numerous crests of thin bone, many of which are minutely denticulated. The cheeks are scaly; but the opercle and maxillary are without scales. The *eye* is round and large, its diameter compared with the length of the head being as 1 to $2\frac{1}{3}$. It is placed high up, a diameter and a half above the throat, but does not quite reach to the profile, and a space equal to less than half the diameter intervenes between it and the muzzle. A thin bony crest is placed behind it, and another in front of it, the latter forming a funnel-shaped cavity below the rather large nostril. Between the eyes there are three low crests without serratures, the middle one of which divides behind. The muzzle is short and obliquely truncate; the lower jaw remarkably deep, and projecting beyond the upper, with an acute boss at the symphysis. The upper border of the mouth, which is strongly oblique, is formed entirely of the slender premaxillary, carrying a double series of minute teeth which are sharp and slightly curved, and reduced in front to a single series. Similar teeth are placed in a single row in the lower jaw. The small tongue, the palatines, and prominent vomer are toothless; but from the upper ends of the maxillaries there projects into the mouth a pair of large tooth-like bones that are compressed, somewhat falcate, and blunt at the tips. The tongue, pharynx, and inner sides of the gill-covers are deep black. The maxillary is extremely broad below, and reaches within a quarter of the diameter to the vertical from the posterior border of the eye. The dilated portion has numerous radiating crests, which are minutely denticulated. The mandibular bones also carry denticulated crests. The seven-rayed branchiostegal membrane is completely concealed by the gill-covers. There are no toothed processes on the œsophagus, nor any folds of skin on the palate. The *opercle* is high, the width, from back to front, being less than one-third of its vertical length. There is an elevated crest at its anterior margin, which is minutely toothed; and the rest of its surface is furnished with numerous simple crests that radiate from a point high up near the anterior margin. The free edge of the opercle is even. The preopercle is narrow, and its lower margin is denticulated; some of its crests are also denticulated. The interopercle is large, and projects beyond the throat; it bears numerous crests, that are denticulated and form small sharp teeth at the margin. The gill-openings are wide; pseudobranchiæ are present; the first free pair of gills carries a series of spiny rakers of moderate length.

The single *dorsal* fin is moderately long, and commences over the vent, somewhat in front of the middle of the back. It appears to be higher in front, and to be destitute of scales. All the rays, except perhaps the last two or three, seem to be simple spines. They are stout, closely set; and the first five are compressed, with minute teeth at their edges; the remaining spines of the fin have also teeth at their edges. It terminates at the end of the curve of the back, where the parallel-edged tail abruptly commences. The *anal* fin is

rather shorter than the dorsal fin; their terminations are in the same vertical. The rays seem to be of the same structure, with spinous edges, but it seems not to have been higher in front. The *pectoral* fin is rather long (about one-third of the total length), rounded at the tip, and inserted below the middle of the height on a level with the bottom of the opercle. The first ray is less than one-third of the second; the fourth ray is slightly the longest; the rays begin to shorten rapidly with the seventh. All except the first two are branched, and these are denticulate on their anterior edges. Several of the others are also denticulate at the sides. The thoracic *ventral* fins are placed slightly behind the root of the pectoral fins. They reach back at least as far as the commencement of the anal fin, but are apparently not elongate. Some of the rays have denticulate edges. At the upper base of each fin there is a free white ovate appendage of bone, nearly seven times as long as wide, resembling in shape the wings of some insects. The surface is obliquely striate, and the sharp edge of the anterior margin is set with a few distant minute teeth. At its base there is a small process directed backwards. The *vent* is in front of the middle of the total length, and the anal fin begins immediately behind it. The *tail* is compressed, and a little longer than high. The caudal fin is forked.

There is no lateral line. A series of about sixty scales may be counted between the opercle and the caudal fin, and about fifty in the height.

The individual was obtained in the month of January. The vertical fins appeared to have suffered damage, and nothing can be positively asserted in regard to certain points which it is desirable to know, such as the height and outline, and the structure of the rays. Neither could it be ascertained whether they had been covered with scales; but it may perhaps be inferred from the spinous sides of the rays that this had not been the case. The rays of the ventral fins seemed to be ten; but whether these were really only five rays split to their bases I could not make out with any degree of certainty. No connecting membrane was to be seen between the first five spines of the dorsal fin, but it may have been removed by accident. The fish had fed on animal food.

The following table shows the dimensions of the principal parts of the specimen which has been sent to the British Museum:—

	inches.
Total length (caudal fin somewhat mutilated)	$3\frac{8}{10}$
Length to commencement of tail	$2\frac{6}{10}$
Height	$2\frac{3}{10}$
Thickness at shoulder	$\frac{4}{10}$
Head, length	$1\frac{4}{10}$
Mouth-cleft, depth	$\frac{2}{10}$
———, width, nearly	$\frac{4}{10}$
Premaxillary, length	$\frac{2}{10}$
Maxillary, width of lower end.....	$\frac{5}{10}$
Eye, diameter	$\frac{6}{10}$
Opercle, height	1

	inch.
Dorsal, distance from muzzle	$1\frac{7}{10}$
——, length of base	$1\frac{3}{10}$
Pectorals, length	$1\frac{2}{5}$
——, distance from muzzle	$1\frac{3}{10}$
Ventrals, distance of their roots from roots of pectorals	$\frac{7}{10}$
Appendage of vertical fins, length	$\frac{1}{10}$
—— — —— —, width, rather more than	$\frac{1}{10}$
Anal, length of base	$1\frac{1}{10}$
Tail, length	$\frac{4}{10}$
—, height	$\frac{3}{10}$
Caudal fin (mutilated)	$\frac{7}{10}$

Order MALACOPTERYGII.

Halosaurus, gen. nov.

Body elongated, clothed with cycloid scales; belly rounded; tail compressed and tapering to a point. Snout projecting much beyond the mouth, which is non-protractile and of moderate size, with the upper border formed by the premaxillary and maxillary bones, the former small, the latter of moderate size and not reaching beyond the eye, both dentiferous. Teeth in villiform bands, in the jaws and on the vomer, palatines, and tongue. A short dorsal over the space between the abdominal ventrals and the long anal, which is coalescent with the caudal, the latter consisting of very few rays. Large gill-openings. Branchiostegal membrane with numerous rays. Stomach cæcal; pyloric cæca in moderate number; a large air-bladder.

No pseudobranchiæ, no barbel nor adipose dorsal.

Halosaurus ovenii. (Pl. XXXVI. fig. 2.)

D. 11. P. 11. V. 10. A. 191! C. 2. M. B. 14. Scales of lateral line about 170.

Body elongated, compressed, attenuating in both directions from the neighbourhood of the dorsal fin, the tail becoming filiform; the belly rounded, except in the neighbourhood of the ventral fins, where it is flattened. Clothed with cycloid scales of a moderate size. The height compared with the total length is as 1 to $14\frac{1}{3}$. The back and sides are brown, the middle of each scale being bluish grey with minute black dots. The belly is grey.

The *head* has something of the aspect of a *Macrourus* or a *Coilia*, the mouth being on the under side. Compared with the total length it is as 1 to $7\frac{1}{2}$. It is unarmed, scaly, slender and depressed, with a projecting snout. At the back there is a transverse narrow scaleless groove, which curves forwards slightly. The lateral *eye* is oval, with an angle before and behind. Compared with the length of the head it is as 1 to 5. It reaches to the profile, and is distant from the snout nearly two of its longer diameters; and the space between the eyes is less than one of such diameters. The snout is curiously formed;

it is much depressed and narrows forwards, but the extremity is rounded. There is an undulating crest near each edge above, and another at each side below, with a mesial keel underneath. It is scaleless, and covered with a soft gelatinous skin. There is a crest across the cheek below the eye, and a groove extends forwards from the inferior margin of the orbit at each side of the snout.

The moderate-sized *mouth* does not reach nearly to the tip of the snout. Neither jaw is in the least protractile. The anterior portion of the upper border is formed by the premaxillary, the remainder by the maxillary, and both bones are set with a band of minute sharp villiform teeth. There is a crest along each border of the maxillary; and that at the posterior margin projects as a tooth, which reaches to the orbit. The maxillary is simple, not composed of three pieces as in the *Clupeidæ*. The mandible is set with teeth similar to those before described. There are no teeth on the vomer; but the short palatines (which come into contact in front) bear minute teeth, and in a line with them behind are the entopterygoids or pterygoids with narrow bands of minute teeth. The rakers of all the branchial arches carry similar teeth. On the hinder part of the tongue, which is black and free at the tip, there is an ovate patch of minute teeth. The mouth is black, as well as the inside of the gill-covers. The gill-openings are large, and the gills consist of four pairs. The subopercle is thin, scaleless, and striate; it projects backwards considerably beyond the opercle, which is scaly, with a rounded even edge. The margin of the preopercle is concealed in the scaly skin. The two orifices of each nostril are small and near together, There is a small cuticular tag at the margin of each orifice.

The triangular *dorsal* fin is placed over the space between the ventral fins and the vent. There are scales on the membrane between the rays. The second and third rays are the longest, and are about twice as long as the base of the fin. The first ray is unbranched, and is only half as long as the two next. The *pectoral* fins are scaleless, pointed, and longer than the ventral fins. They are inserted in the upper half of the height, and have narrow bases. The abdominal *ventral* fins are distinct, but inserted close together; they are scaly, truncate, and the first two rays are unbranched. At the outer angle of the base there is a thin pointed scale. The *vent* is placed in the anterior half of the total length of the fish, and has no papilla near it. The *anal* fin is high throughout, but is higher in front than behind. The first three rays are unbranched; the base is scaly, and the fin extends with numerous rays up to the *caudal*, which is represented by two hair-like rays.

The *lateral line* is very low down, and commences at the lower angle of the subopercle. It follows a straight course until it reaches the lower edge of the body, where it is lost. About 170 scales may be counted in the length of the body between the opercle and the tip of the tail. In the height of the body there are twenty-two scales, of which five are below the lateral line.

The single individual obtained was caught in the month of Feb-

ruary. It was a female with eggs, which lay in two masses side by side, 5½ inches long, uncovered with a sac. The cæcal stomach was small, and contained nothing but a little much-digested matter. There were twelve small pyloric cæca, which increased in length backwards. The air-bladder had a delicate silvery coat, and was 5 inches long. The liver had a length of 1⅛ inch. The intestine was straight. The peritoneum was black anteriorly; posteriorly there were patches of black lines on a pale ground.

The following are the dimensions of the specimen, which is now in the British Museum:—

	inches.
Total length	18 5/16
Height between dorsal and ventral	1 3/10
Head	2 7/16
Eye, longer axis, nearly	1/2
—, distance from tip of snout	1 9/20
Eyes, distance apart	7/20
Dorsal, length of base	7/10
——, height	1¼
——, distance from snout	5⅜
Pectorals, length	1 9/16
——, width of base	¼
——, distance from snout	2½
Ventrals, length	1
——, distance from snout	4 6/10
Vent, distance from snout	7 1/8
Anal, height of fourth and the neighbouring rays	4/5
Caudal, two rays	4/10

This species is dedicated to Professor Richard Owen, Superintendent of the Natural History Departments of the British Museum, whose investigations in regard to the skeleton of fishes are not the least valuable part of his many contributions to zoological science.

Chiasmodon, gen. nov.

Body naked, elongate, with two perfect dorsal fins, one anal fin, simple thoracic ventral fins, and distinct caudal fin. Head unarmed and exappendiculate. Snout short, truncate. Cleft of the mouth very long, extending much beyond the eyes. Acute teeth in two series in the premaxillary and the mandible, those of the inner series being moveable. Hooked teeth, and teeth that cross each other from opposite sides of the mouth in the upper jaw. Teeth on the palatines, but not on the vomer. Eyes lateral. Gill-openings large; four pairs of gills. Seven branchiostegal rays. No pseudobranchiæ: no anal papilla. An air-bladder.

Chiasmodon niger, sp. n.

1st D. 11. 2nd D. 13 A. 17. P. 12. V. 6. C. 14. M. B. 7.

Body black, naked, moderately elongate, compressed, and slender. Head unarmed, thick, subcubical, depressed, with a wide groove

between the eyes, and two low ridges which meet in front of them. Cheeks flat; opercle rounded behind, with a notch at the junction of the subopercle and interopercle. Eyes lateral, nearly round, placed about a diameter from the muzzle (in front of the middle of the upper jaw) and about the same distance apart, with the orbit taking part in the profile. The hinder nostril, which is the larger, is placed very near the orbit. Muzzle short, truncate, subemarginate; the under jaw somewhat longer. Mouth-cleft slightly oblique, long, extending much beyond the eyes; the upper border formed entirely of the slender premaxillary, the toothless maxillary being a little dilated at the ends. Two series of subulate teeth in each jaw, those of the inner series being longer, but fewer in number. At the fore-end of the upper jaw are two long immoveable hooked teeth, which are inclined towards each other and nearly meet. At the base of each is a minute sharp tooth. Next to the hooked pair is a pair of curving teeth, which cross one another from opposite sides of the mouth; these are moveable, and are the longest teeth in the upper jaw. At the fore-end of the lower jaw there is a pair of very small teeth in front of a larger pair of immoveable teeth, which curve outwards. Next to these are two pairs of still longer moveable teeth, the hinder pair being the longest in the mouth. The other jaw-teeth are much smaller. On the palatines there is a series of small pointed teeth, and the middle line of the tongue is serrate. The vomer is prominent, but toothless. The tongue is grey, narrow, and free near the tip. There is no barbel, nor are there any pseudobranchiæ.

The anterior *dorsal* fin has eleven weak unbranched rays. It commences over the posterior edge of the opercle; and its base is rather less than half the length of the head, its height being about the same. The second dorsal fin is separated from the first by a space equal to about one-third the length of the head. It has a trapezoidal shape, and a longer base than the first dorsal. Its height in front is rather more than half the length of the head. The fourth and fifth rays are rather longer than their neighbours.

The pointed *pectoral* fins are inserted in a line with the eyes, and reach back to the commencement of the second dorsal fin.

The thoracic *ventral* fins are only about half as long as the pectoral fins; their apices are truncate, the first ray being the shortest. All the rays are weak, and none are detached.

The *anal* fin commences about the middle of the total length of the fish, under the fifth or sixth ray of the second dorsal fin. The length of its base is equal to about two-thirds of the length of the head. It becomes low behind. The first ray is short; the second only half as long as the third; the sixth and seventh are the longest.

The *caudal* fin is furcate, and equal in length to two-thirds of the length of the head. There are about fourteen principal rays, with a few small ones at each side.

The *lateral line* is oblique in the pectoral region, but for the greater part of its length is straight along the middle of the body.

An air-bladder of moderate size is present. No anal papilla was observed.

A single example of this new genus of Malacopterygian Fishes was taken in the month of March, and has been deposited in the British Museum. Its stomach contained the doubled-up body of an entire fish nearly twice its own length. The latter proved to be a specimen of *Gonostoma denudata*, Bp. (Faun. Ital. iii. 138), as stated in one of my papers on rare Madeiran Fishes, printed in the 'Ann. & Mag. Nat. Hist.' 1862. The stomach of the fish now described was so much injured that some points of its structure could not be made out. The greatest height of the fish could not be accurately determined, nor could the precise situation of the vent be ascertained. The stomach appeared to be capable of great extension. The rays of the first dorsal fin were unconnected by any membrane, which, however, may have disappeared through rough treatment. The teeth forming the outer series in the upper jaw were about twenty-four on each side, exclusive of the longer teeth in front; of the inner series only two or three could be counted, others had probably been present. The outer row in the lower jaw consisted of about sixteen teeth on each side, without counting the long ones in front.

The following are the dimensions of the specimen :—

	inches.
Total length	3 7/10
Height over middle of anal, rather more than	3/20
Head, length	9/10
——, height	4/10
Eye, diameter	1/5
Maxillary	7/10
Teeth, length of fourth pair under jaw	3/20
First dorsal, height and length of base	4/10
—— ——, distance from muzzle	9/10
Second dorsal, distance from muzzle	1 6/10
——— ——, distance from first dorsal	1/10
——— ——, length of base	3/20
——— ——, height	5/10
Pectorals, length	6/10
———, width of base	1/10
———, distance from muzzle	1
Ventrals, length	7/20
Anal, distance from muzzle	1 5/10
——, length of base	6/10
——, height in front	5/10
Caudal, length	6/10
Air-bladder, length	1/2

9. Supplemental Catalogue of Terrestrial and Fluviatile Mollusks collected in Guatemala by O. Salvin, Esq., M.A., F.Z.S. By the Rev. H. B. Tristram, Corr. Mem.

In a communication made to this Society on May 28, 1861, I reported that Mr. Salvin's collection of Guatemalan shells, made during his first visit, comprised forty-nine species, then enumerated. Mr. Salvin has since kindly entrusted to my care the produce of his second visit, which enables me to make considerable additions to the former list. Of the forty-nine species already enumerated, and which were chiefly collected in the immediate neighbourhood of Dueñas, thirty reappear in Mr. Salvin's later and much smaller collection, formed chiefly in the district of Vera Paz and the Lake Peten. This region has supplied all the novelties of the present catalogue. The numbers are in continuation of the former paper.

Former Species.

4. Helix euryomphala, Pfr. Very large and fine specimens, in the second collection from the mountain-forests of Vera Paz.

11. Succinea (putris?) is *S. salleana*, Pfr.

14. Achatina —— (species doubtful). Has been identified by Dr. Pfeiffer as *A. trypanoïdes*, Pfr.

Additional Species.

50. Helix vitrinoïdes, nov. spec.

T. peranguste umbilicata, depressa, apice subinfosso, pellucida, aspera, tenuissima, vix setosa; spira plana, immersa; anfractus 4½; sutura profunda; anfract. ultimus rotundatus, rapide crescens, et dimidium testæ occupans, antice descendens; apertura rotunda, expansa; peristomium rectum, simplex.

Diam. maj. 13 mill., min. 11 mill., alt. 7.

Hab. Forests of Vera Paz.

51. Helix almonte, nov. spec.

T. profunde umbilicata, depressa, semiglobosa, tenuis, cornea, delicatissime striata; spira paullulum elevata; sutura profunda; anfract. 5½, leviter accrescentes, turgidi; apertura parum obliqua, subcircularis; peristomium rectum, margine columellari ad perforationem reflexiusculo.

Diam. maj. 11 mill., min. 9½ mill., alt. 6 mill.

Hab. Vera Paz.

52. Helix salvini, nov. spec.

T. profunde umbilicata, conica, trochiformis, rufo-cornea, acute carinata; spira conica, vertice nitido; sutura profunda; anfract. 7, convexiusculi, regulariter accrescentes, liris transversis acutis et forte conspicuis nec continuis regulariter superne

ornati; anfract. ultimus subtus delicate striatus; peristomium subrufum, politum, reflexum; apertura semilunaris.
Diam. maj. 3 mill., min. vix 3 mill., alt. 2½ mill.
Hab. Mountain-forests of Vera Paz.

53. BULIMUS UNDATUS, Brug.
Hab. Dueñas.

54. BULIMUS VIRGULATUS, Fér.
Hab. Vera Paz.

55. ACHATINA —— ?
Hab. Vera Paz.

56. ACHATINA —— ?
These two species, allied to *A. trypanoïdes* and *A. octona*, have been sent to Dr. Pfeiffer for description.

57. GLANDINA BINNEYANA, Pfr.
Hab. Vera Paz.

58. GLANDINA MONILIFERA, Pfr.
Hab. Forests of Vera Paz.

59. SPIRAXIS NIGRICANS, Pfr.
Hab. Near Lake Peten, Vera Paz.

60. PHYSA AURANTIA, Lam.
Hab. Vera Paz.

61. PHYSA ELLIPTICA, Say.
Variety. Scarcely sufficiently distinct to be specifically described, but rather more elongated.
Hab. Dueñas.

62. CYLINDRELLA ARCTISPIRA, Pfr.
Hab. Vera Paz.

63. CHONDROPOMA OTTONIS, Pfr.
Hab. Dueñas and Vera Paz.

64. CISTULA TROCHLEARIS, Pfr.
Variety. Larger and more richly coloured than the specimen from Dueñas.
Hab. Vera Paz.

65. SCHASICHEILA ALATA, Menke.
Hab. Vera Paz.

66. SCHASICHEILA ——, sp. indeter.
Specimens imperfect.
Hab. Vera Paz.

67. Helicina lirata, Pfr.

Hab. Mountain-forests of Vera Paz.

68. Melanoïdes glaphyra, Morelet.

Hab. Rio de la Paçion.

69. Melanoïdes obeliscus, Reeve.

Hab. Lake Peten.

70. Melanoïdes tumida, nov. spec.

T. oblongo-pyramidata, solida, ponderosa, nigricans, apice plerumque sed non semper eroso; anfract. 7–8, *planulati, ultimus* $\frac{2}{3}$ *longitudinis testæ æquans; sutura inconspicua; apertura cærulea, oblonga, margine columellari paullulum effuso; peristomium infra productum. Operculum corneum, nigrescens, hemicyclium.*

Long. 65, lat. 32; apert. long. 23, lat. 15 mill.

Hab. Lake Peten, Vera Paz.

This species may be distinguished from the following by its more obtuse form and larger mouth, and by the greater size and convexity of the last whorl.

71. Melanoïdes godmanni, nov. spec.

T. elongato-pyramidata, solida, nigricans vel fusco-nigricans, apice sæpe eroso; anfract. 8–9, *planulati, crassiusculi, ultimus* $\frac{2}{5}$ *longitudinis totius æquans; sutura minime profunda; apertura cæruleo-albescens, oblonga, infra rotundata, margine columellari paullulum effuso. Operculum corneum, nigrescens, oblongo-ellipticum.*

Long. 70, lat. 26; apert. long. 20, lat. 14 mill.

Hab. Another part of Lake Peten, Vera Paz.

72. Melanoïdes salvini, nov. spec.

T. elongato-turrita, solidiuscula, nigrescens vel olivacea; anfract. 10–11, *convexiusculi, leviter accrescentes; sutura satis profunda; anfractus ultimus lineis elevatis longitudinaliter subtus striatus; apertura ovato-oblonga, intus cornea; peristomium arcuatum et subtus productum. Operculum nigrum, oblongum.*

Long. 63, lat. 19; apert. long. 13, lat. 8 mill.

Hab. Rio de la Paçion, Vera Paz.

73. Pachycheilus lævissimus, Sow.

Hab. Rio de la Paçion, Vera Paz.

74. Pachycheilus gracilis, nov. spec.

T. turrita, fusca vel olivacea, nitida, apice decollato; anfract. 5–6, *superstites subconvexi, regulariter accrescentes; sutura mediocris; apertura rotundata, effusa, brunnea; perist. valde productum, infra paullulum arcuatum.*

Long. tot. superstit. 26, lat. 10; apert. long. 9, lat. $7\frac{1}{2}$ mill.

Hab. Lake Peten, Vera Paz.

75. Melania petenensis, nov. spec.

T. elongato-pyramidalis, solidiuscula, olivacea vel nigrescens, striis brunneis ornata, plerumque apice eroso; anfract. 6–7, superst. sulcis confertis longitudinalibus et continuis regulariter ornati, planiusculi; sutura mediocris; apertura elongato-ovata, albida; columella paullulum producta nec effusa; peristomium tenue, arcuatum; operculum ovatum.

Long. tot. 29, lat. 10; apert. long. 10, lat. 5 mill.

Hab. Lake Peten, Vera Paz.

76. Pomus columbiensis, Sow.

Hab. Lake Peten, Vera Paz.

77. Pomus giganteus, nov. spec.

T. globosa, solida, profunde et anguste umbilicata, pallidissime olivacea, sed apice viridi; spira exserta; anfract. 7, rapide accrescentes, ad suturam acute angulati, ultimus turgide efflatus, duo ultimi fortiter et irregulariter reticulati liris innumerabilibus longitudinalibus et latitutinalibus intersectantibus (super ult. anfr. plus quam 40 sulcos enumeravimus); apertura semilunaris, nitida, splendide purpurea, lineis intensioribus ad partem superiorem ornata; labrum tenue, subreflexum, acutum, margine columellari luteo.

Diam. maj. 90, min. 85, alt. 95; apert. alt. 66, lat. 39 mill.

Hab. Lake Peten, Vera Paz.

78. Ampullaria lattrei, Reeve.

Hab. Lake Peten, Vera Paz.

79. Unio veræ pacis, nov. spec.

T. oblonga, tenuis, compressa, postice valde compressa et expansa, antice obtuse rotundata; umbones parvi, rotundatati, ligamento exserto et conspicuo; epidermis olivacea, radiis obscurioribus ornata; margo ventralis extremitate posteriore compressa et incisa; dentes cardinales tenues, compressi, crenati; impressiones musculares fortissimæ et scaberrimæ, testa intus nacreo purpureo micans.

Long. 45, lat. 25, alt. 16 mill.

10. Descriptions of New Species of Freshwater Shells collected by Mr. F. G. Waterhouse, during J. M'Donall Stuart's Overland Journey from Adelaide to the North-west Coast of Australia. By Arthur Adams, F.L.S., and G. French Angas, Corr. Memb. Z. S.

1. Vivipara waterhousii, Ad. & Ang.

V. *testa turbinata, globoso-conica, late umbilicata, spira elatiuscula, epidermide tenui fusco-viridi obtecta; anfractibus convexis, ad suturas subplanatis, fasciis tribus vel quatuor angustis*

olivaceo-viridibus transversis ornatis ; anfractu ultimo inflato, lineis duabus impressis ad peripheriam instructo ; apertura ovata, postice subangulata ; labio simplici ; labro acuto.

Long. 2 inches, lat. 1 inch 8 lines.

Hab. Newcastle Waters, Arnheim's Land (*Coll. Angas.*).

This fine species most nearly resembles *V. ussuriensis*, Gerst.; but the last whorl is more inflated, and the surface of the shell is not malleated or lirate. It is the largest species yet discovered on the Australian continent. We have great pleasure in dedicating it to F. G. Waterhouse, Esq., who, under great difficulties during the expedition, succeeded in making many valuable additions to science.

2. Vivipara kingi, Ad. & Ang.

V. *testa turbinata, globoso-conica, umbilicata, spira mediocri erosa nodulosa, epidermide tenui pallide fusco-viridi obtecta, ad apicem purpurascente ; anfractibus convexis, lineolis transversis et longitudinalibus elevatis decussatis, anfractu ultimo ad basin sulcis impressis spiralibus instructo ; apertura ovata, antice subeffusa ; labio vix reflexo.*

Long. 1 inch, lat. 8 lines.

Hab. King's Ponds, Arnheim's Land (*Coll. Angas.*).

This is a neat, finely decussated, concolorous species, with the upper whorls nodulous from erosion, as in *V. prærosa*, Gerst. It is named after Mr. Stephen King, one of the gentlemen who accompanied the expedition.

3. Melania (Melasma) onca, Ad. & Ang.

M. *testa fusiformi-turrita ; spira elata, conica ; epidermide pallide olivaceo induta, rufo-fusca, pulcherrime maculata, maculis sæpe in lineis undulatis longitudinalibus dispositis ; anfractibus planis, longitudinaliter plicatis, plicis æqualibus regularibus subdistantibus, ad suturas nodulosis ; apertura oblongo-ovata, antice effusa ; labio subincrassato ; labro simplici, acuto.*

Long. 1 inch, lat. 4 lines.

Hab. Tributary of Adelaide River, Arnheim's Land (*Coll. Angas.*).

A species remarkable both for the elegance of its form and the beauty of its painting. The whorls are plicate, with a necklace-like series of nodules at the sutures; and the shell is covered with dark red-brown spots, suggestive of its specific name.

4. Amphipeplea vinosa, Ad. & Ang.

A. *testa ovata ; spira mediocri, tenui, semipellucida, vinosa ; anfractu ultimo magno, ventricoso, postice ad suturas gibboso ; apertura ovata ; labio callo tenui mediocri obtecto, columella spiraliter tortuosa ; labro convexo, margine acuto.*

Long. 9 lines, lat. 5 lines.

Hab. Tributary of Adelaide River, Arnheim's Land (*Coll. Angas.*).

This species may readily be distinguished on account of its peculiar vinous colour. The whorls are posteriorly gibbose or tumid at the sutures, and the callus is less spreading than in others of the genus.

5. Amphipeplea phillipsi, Ad. & Ang.

A. *testa ovata; spira elata, acuta, tenui, cornea; anfractu ultimo magno, non ventricoso, transversim creberrime striato; apertura oblongo-ovali; labio callo tenui expanso obtecto; labro simplici, acuto.*

Long. 9 lines, lat. 4 lines.

Hab. Arnheim's Land (*Coll. Angas.*).

A neat, horn-coloured, finely transversely striated species, with an acute elevated spire. We have named it after Mr. T. Phillips, who has assiduously collected many new Australian shells.

6. Physa newcombi, Ad. & Ang.

P. *testa ovata, umbilicata; spira mediocri, acuta, ad apicem integra, cornea, viridescente aut pallide fulva; anfractibus quinque, convexis, sæpe plus minusve transversim subliratis; apertura ovata; labio reflexo, umbilicum partim tegente; labro vix incrassato, peristomate nigrescente.*

Long. 10 lines, lat. 7 lines.

Hab. Ponds at Mount Margaret (*Coll. Angas.*).

We have much pleasure in naming this noble *Physa* after Dr. Newcomb, the distinguished American conchologist, who has contributed so much, by his researches in the Sandwich Islands, to our knowledge of the genus *Helicter* or *Achatinella*. The species is widely umbilicated, and the peristome is usually dark-coloured.

7. Physa ferruginea, Ad. & Ang.

P. *testa ovata, rimata, ferruginea; spira mediocri, apice eroso; anfractibus tribus, convexis, simplicibus, transversim crebre crenato-striatis; apertura ovata, intus purpurascente; labio tenui, late reflexo; labro acuto.*

Long. 5 lines, lat. 4 lines.

Hab. Arnheim's Land, N.W. Australia (*Coll. Angas.*).

This is a small ferruginous species, with the whorls finely transversely striated.

8. Physa badia, Ad. & Ang.

P. *testa elongato-ovata, imperforata, solida, badia; spira elata, apice obtuso eroso; anfractibus quinque, convexiusculis, longitudinaliter strigillatis; apertura elongato-ovata; labio albo, excavato, lirula antica subspirali instructo; labro arcuato, in medio producto, intus fusco tincto.*

Long. 1 inch, lat. 6 lines.

Hab. Tributaries of Adelaide River, Arnheim's Land (*Coll. Angas.*).

A fine, solid, brown species, generally more or less eroded, and with a peculiarly strongly plicate columella.

9. Physa olivacea, Ad. & Ang.

P. *testa elongato-ovata, imperforata, solidiuscula, olivacea; spira elata, attenuata, apice eroso; anfractibus quinque, convexius-*

culis; apertura ovato-acuta; labio incrassato, flexuoso; labro acuto, margine arcuato.

Long. 6 lines, lat. 3 lines.

Hab. Arnheim's Land (*Coll. Angas.*).

A neat olive-coloured species, somewhat resembling in form the British *Aplexa hypnorum*, but without the polished exterior of the latter.

10. Physa concinna, Ad. & Ang.

P. *testa ovata, imperforata, solidiuscula, cornea; spira brevi, acuta, apice interdum papilloso; anfractibus quinque, convexiusculis, transversim striatis; apertura acuto-ovata; labio incrassato, spiraliter valde tortuoso; labro intus incrassato et fusco tincto, margine acuto, arcuato.*

Long. 6 lines, lat. 3 lines.

Hab. Arnheim's Land (*Coll. Angas.*).

A pale horn-coloured, somewhat solid species, with a moderately elevated spire, acute (not eroded) at the apex, and with the terminal whorls sometimes papillary.

11. Physa (Ameria) reevii, Ad. & Ang.

P. *testa ovali, postice abrupte truncata, imperforata, cornea; spira plana, tenui; anfractibus quatuor, planis, ultimo permagno, postice acute angulato, transversim obsolete striato; apertura oblongo-truncata; labio antice valde tortuoso; labro postice angulato.*

Long. 6 lines, lat. 4 lines.

Hab. Arnheim's Land (*Coll. Angas.*).

We have much pleasure in dedicating this singular species to Mr. Lovell Reeve, who has evinced much interest in the shells of this group. The last whorl is acutely angulate posteriorly, and the spire is tabulated, giving to the shell a peculiar truncate appearance.

12. Physa (Ameria) bonus-henricus, Ad. & Ang.

P. *testa ovata, rimata, tenui, cornea; spira vix elata, plana; anfractibus tribus, planis, postice angulatis, ultimo magno, inflato, ventricoso, postice subangulato, longitudinaliter plus minusve plicato; apertura ovata; labio tenui, subtortuoso; labro simplici, margine arcuato.*

Long. 4 lines, lat. 2½ lines.

Hab. Arnheim's Land (*Coll. Angas.*).

This is a small inflated species, with a short truncate spire. We have dedicated it to the founder of the section *Ameria*, a gentleman well known for his deep researches in conchology.

13. Unio (Alasmodon) stuarti, Ad. & Ang.

U. *testa transversim elongato-ovata, tenui, compressa, epidermide olivaceo-fusca induta, postice corrugato-plicata, latere antico breviore rotundato, postico longiore oblique subtruncato, margine ventrali regulariter arcuato; umbonibus parvis, erosis, den-*

tibus cardinalibus elongatis valde divergentibus, postico bifido, antico prominulo; intus iridescente.

Alt. 1½ inch, lat. 3 inches 2 lines.

Hab. Lagoon, Mount Margaret, Central Australia (*Coll. Angas.*).

This species, which we have named after Mr. J. M°D. Stuart, the leader of the expedition, is the only Naïad, besides *Alasmodon angasana* of Lea, yet discovered in the regions traversed by the explorers.

11. Descriptions of New Species of Shells from the Australian Seas, in the Collection of George French Angas. By Arthur Adams, F.L.S., and G. F. Angas, Corr. Mem. Z. S.

(Plate XXXVII.)

I. Gasteropoda toxifera.

The southern shores of the Australian continent, compared with those extending into the Tropics, are by no means prolific in species of the genus *Conus*; *C. novæ-hollandiæ* and *C. anemone* (species frequently confounded) are the most abundant. The *Turris* or *Pleurotoma* family are better represented; and we have selected for description some interesting new forms. To the limited genus *Euryta* (a peculiar group of *Terebridæ*) we have added two new species.

1. Euryta trilineata, Ad. & Ang. (Pl. XXXVII. fig. 13.)

E. *testa turrito-fusiformi, gracili; spira quam apertura longiore; albida, fasciis longitudinalibus undulatis fuscis, et serie macularum fuscarum ad suturas ornata, lineisque tribus transversis filiformibus ad anfractum ultimum succincta; anfractibus* 9, *planiusculis, longitudinaliter plicatis, plicis in medio anfractuum subnodulosis, in anfractu ultimo obsoletis, transversim sulcatis, sulcis subdistantibus; apertura angusta; labio antice violascente tincto.*

Long. 7 lines, lat. 1¼ line.

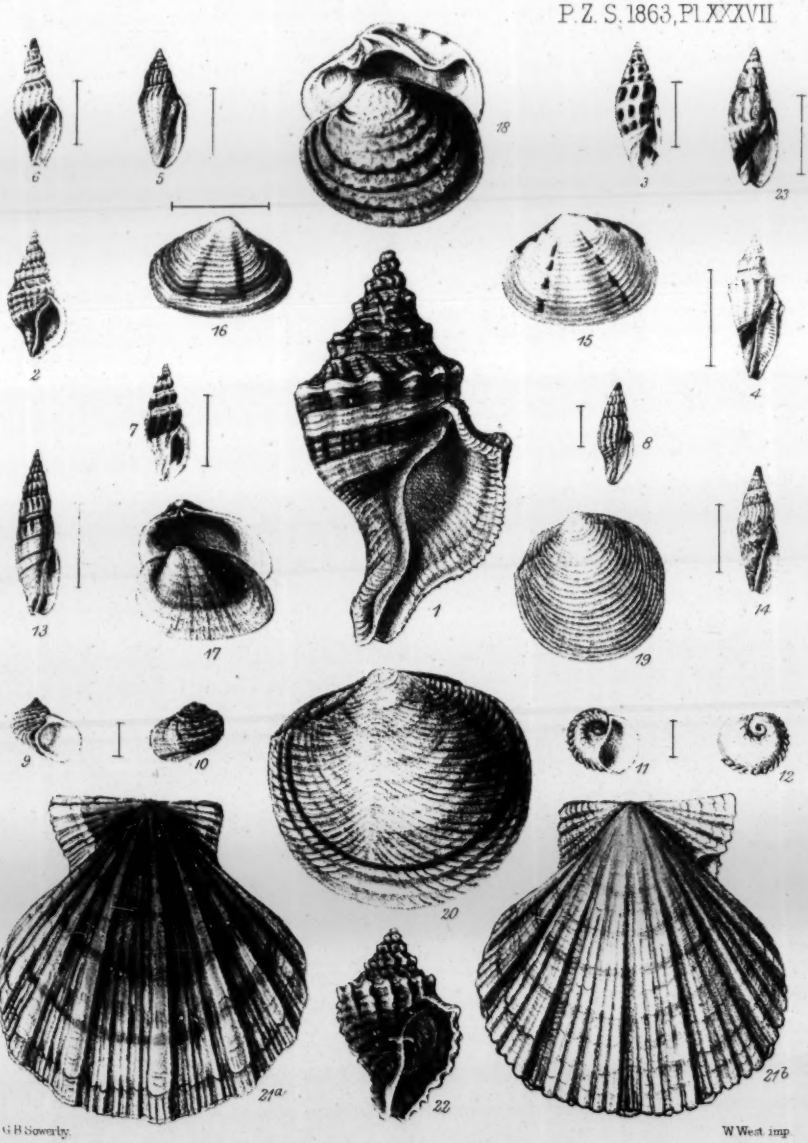
Hab. Port Jackson (*Coll. Angas.*).

This species of *Euryta* (a group separated from *Terebra* on account of the spirally rolled axis and Mitriform aspect) differs from the others described in being more slender, and in the whorls being encircled with thread-like lines.

2. Euryta pulchella, Ad. & Ang. (Pl. XXXVII. fig. 14.)

E. *testa olivæformi; spira quam apertura breviore; alba, nitida, lineis longitudinalibus undulatis confertis pallide fulvis ornata; anfractu ultimo fasciis tribus albis transversis instructo, an fractibus longitudinaliter plicatis, plicis parvis confertis, in anfractu ultimo obsoletis, suturis crenatis; apertura angusta; labio subflexuoso; labro simplici, acuto.*

Long. 5 lines, lat. 1½ line.



G.B.Sowerby. W.West. imp.

Fig 1. Fusus Tasmaniensis. 2. Adamsia Adelaidæ. 3. Olivella pardalis. 4. Cithara angela. 5. C. compta. 6. C. bella. 7. Mangelia picta. 8. M. insculpta. 9, 10. Fossarina patala. 11, 12. Adeorbis Angasi. Adams. *13. Euryta trilineata. 14. E. pulchella. 15. Grassatella aurora. 16. C. Banksii. 17. Narinio rubiginosa. 18. Sunetta Aliciæ. 19. Lucina concentrica. 20. L. Cumingi. 21. a, b. Pecten Tasmanicus. 22. Purpura Flindersi. 23. Olivella leucozona.*

All but 11, 12, of Adams & Angas.

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Hab. Rapid Bay, South Australia (*Coll. Angas.*).

An oliviform glabrous species, delicately painted with pale fulvous zigzag markings.

3. CITHARA ANGELA, Ad. & Ang. (Pl. XXXVII. fig. 4.)

C. *testa ovato-fusiformi; spira elata, acuta, quam apertura breviore; lactea, ad basin rufo tincta; anfractibus planis, postice excavatis, longitudinaliter plicatis, plicis validis costiformibus angulatis, in medio subacute nodosis, transversim crebre striatis; apertura angusta; labio transversim tenuiter lirato; labro extus varicoso, intus lirato-dentato, margine acuto postice sinuato, fusco tincto, intus antice violascente.*

Long. 7½ lines, lat. 3 lines.

Hab. Woodlark Island; Com. Loring, H.M.S. 'Iris' (*Coll. Angas.*).

A lovely species of the typical *Citharæ*. It is pure white, tinged at the base with red-brown, and with the fore part of the aperture stained violet within.

4. CITHARA COMPTA, Ad. & Ang. (Pl. XXXVII. fig. 5.)

C. *testa ovato-fusiformi; spira conica, quam apertura breviore; pallide fulva, ad suturas fusco maculata; anfractibus convexiusculis, longitudinaliter plicatis, plicis parvis distantibus, ad suturas productis et nodulosis, transversim valde striatis; apertura angusta; labio lævi, in medio subflexuoso; labro extus varicoso, margine tenui arcuato postice late sinuato.*

Long. 6 lines, lat. 2 lines.

Hab. New South Wales (*Coll. Angas.*).

A neatly sculptured, pale fulvous species, most nearly allied to *C. lyrata*, Reeve.

5. CITHARA BELLA, Ad. & Ang. (Pl. XXXVII. fig. 6.)

C. *testa ovato-fusiformi; spira elata, aperturam æquante, apice purpurascente papilloso; alba, antice plumbeo tincta, ad basin fusca, postice seriebus duabus transversis macularum fulvarum ornata; anfractibus convexiusculis, longitudinaliter plicatis, plicis validis subconfertis flexuosis; apertura elongata, latiuscula; labio liris transversis instructo; labro extus varicoso, intus lævi, margine acuto postice subsinuato, antice rufo tincto.*

Long. 5 lines, lat. 1¾ line.

Hab. Rapid Bay, South Australia (*Coll. Angas.*).

A delicately tinted species, with the fore part of the aperture tinged with rufous, and with the whorls adorned with two rows of pale fulvous.

6. MANGELIA PICTA, Ad. & Ang. (Pl. XXXVII. fig. 7.)

M. *testa turrito-fusiformi; spira producta, quam apertura longiore; pallide fulva, fascia lata fusco-purpurascente in medio anfractuum ornata, zonula transversa postica alba opaca instructa; anfractibus convexiusculis, longitudinaliter plicatis, plicis costiformibus distantibus flexuosis, transversim crebre*

sulcatis; apertura elongata; labio simplici; labro extus varicoso, intus lævi, margine acuto postice late sinuoso.

Long. 6 lines, lat. 2 lines.

Hab. Port Jackson (*Coll. Angas.*).

A very prettily painted species, the upper part of the whorls being pale fulvous, and the lower purplish brown, with an intermediate opake white band with fuscous edges.

7. MANGELIA INSCULPTA, Ad. & Ang. (Pl. XXXVII. fig. 8.)

M. *testa turrito-fusiformi; spira quam apertura longiore, nucleo violaceo; sordide alba, antice fusco tincta; anfractibus planis, longitudinaliter plicatis, plicis costiformibus postice subangulatis, regularibus, transversim liratis, interstitiis fusco tinctis; apertura elongata, angusta; labio simplici, subarcuato; labro extus varicoso, postice vix angulato, margine acuto, sinu postico obsoleto.*

Long. 3 lines, lat. 1 line.

Hab. St. Vincent's Gulf, South Australia (*Coll. Angas.*).

A small plicate species, very strongly transversely grooved, the grooves stained with fuscous, and with the nucleus deep violet.

8. BELA MITRALIS, Ad. & Ang.

B. *testa ovato-fusiformi, turrita, pallide fulva, ad suturas maculis rufo-fuscis ornata; anfractibus 7, postice subangulatis, ad suturas subexcavatis, longitudinaliter plicatis, interstitiis transversim striatis, plicis in anfractu ultimo obsoletis; apertura elongata, angusta; labio lævi, simplici; labro tenui, regulariter arcuato.*

Long. 8 lines, lat. 3 lines.

Hab. Port Jackson (*Coll. Angas.*).

An elegant pale-yellow mitriform species, ornamented with a series of red-brown blotches at the suture of the last whorl.

9. BELA AUSTRALIS, Ad. & Ang.

B. *testa ovato-fusiformi, sordide alba; spira aperturam æquante; anfractibus 6, convexiusculis, longitudinaliter plicatis, plicis costiformibus angustis, ad suturas arcuatis, interstitiis transversim valde sulcatis; labro tenui simplici.*

Long. 7 lines, lat. 2½ lines.

Hab. Aldinga Bay, South Australia (*Coll. Angas.*).

This southern *Bela* combines the form of *B. nebula* with the sculpture of *B. turricula*.

10. CLATHURELLA RETICOSA, Ad. & Ang.

C. *testa ovato-fusiformi, fusca, anfractu ultimo fascia pallida transversa ornato; anfractibus 6, planiusculis, ad suturas vix angulatis, liris validis longitudinalibus et transversis reticulatis; apertura elongato-ovata; labio simplici; labro intus nodoso-lirato, sinu mediocri.*

Long. ½ inch, lat. 2½ lines.

Hab. Middle Harbour, Port Jackson (*Coll. Angas.*).

A species very similar in its general character to *C. purpurea*, Bl., from the Mediterranean.

II. Gasteropoda proboscidifera.

The genus *Adamsia*, Dunker, appears to be an Australian form, resembling a sculptured *Cominella* without the sutural constriction of the whorls. To the type (*Adamsia typica*, Dunk.) we have added a second species from Port Adelaide. We have further augmented the genus *Olivella* by the addition of three very pretty species from the coast of New South Wales. Our *Amauropsis moerchi* is a southern representative of an arctic group of *Naticidæ*.

1. Purpura flindersi, Ad. & Ang. (Pl. XXXVII. fig. 22.)

P. *testa ovata, viridescenti-alba; spira elata, conica; anfractibus 5, postice angulatis, liris elevatis transversis et longitudinalibus late cancellatis, liris squamulis lamellosis longitudinalibus imbricatis instructis; anfractu ultimo antice coarctato; apertura trigonali-ovata, intus cinerea; labio subplano, fusco-violascente tincto; labro intus fusco-violaceo, liris pallidis transversis instructo, margine albo crenato.*

Long. 1¼ inch, lat. 9 lines.

Hab. York's Peninsula, South Australia (*Coll. Angas.*).

A cancellated *Trophon*-like species, with the interior of the aperture stained with rich violet-brown, and with the edge of the outer lip white.

2. Adamsia adelaidæ, Ad. & Ang. (Pl. XXXVII. fig. 2.)

A. *testa ovato-fusiformi, carneo-fusca; spira elata, quam apertura longiore; anfractibus 7, convexis, lamellis longitudinalibus confertis imbricatis et liris validis transversis nodulosis (in anfractu ultimo 6) instructis; apertura ovata, antice subrostrata; labio simplici; labro arcuato, margine subincrassato vix reflexo.*

Long. 8 lines, lat. 3¼ lines.

Hab. Port Adelaide (*Coll. Angas.*).

This is a second species of a peculiar Australian form separated by Dr. Dunker under the above name. It differs from *A. typica*, Dkr., in its more elevated spire, and in the whorls being longitudinally lamellose and not granular.

3. Fusus tasmaniensis, Ad. & Ang. (Pl. XXXVII. fig. 1.)

F. *testa ventricoso-fusiformi; spira aperturam æquante; luteo-aurantiaca, plus minusve rufo fasciata (fasciis tribus in anfractu ultimo); anfractibus 7, in medio nodoso-plicatis, transversim liratis, liris majoribus cum minoribus alternantibus; apertura trigonali-ovata, intus luteo-alba; labio simplici, arcuato, rostro brevi ad sinistram inclinato; labro intus sulcato, margine postice angulato.*

Long. 2¾ inches, lat. 1½ inch.

Hab. Spencer's Gulf, South Australia (*Angas*); Tasmania (*Cuming*) (*Coll. Angas.*).

A showy species, most nearly allied to *F. raphanus*, Quoy & Gaim.; characterized by its ventricose whorls, its short beak, and its pale yellowish orange-colour banded with chestnut. Mr. Cuming possesses a specimen of this species much larger than those from Spencer's Gulf.

4. CYLLENE LACTEA, Ad. & Ang.

C. *testa fusiformi-ovata; spira elata, conica, apice decollato; lactea, epidermide tenui nitida pallide fusca induta; anfractibus superioribus longitudinaliter plus minusve plicatis, plicis in anfractu ultimo obsoletis, transversim liratis, liris antice validioribus; apertura oblonga, columella antice liris subspiralibus obliquis elevatis instructa; labro intus sulcato.*

Long. 6 lines, lat. 3 lines.

Hab. Port Stephens, New South Wales (*Coll. Angas.*).

A milk-white species, covered with a very thin brownish epidermis; upper whorls longitudinally plicate, and the apex of the spire decollated.

5. OLIVELLA PARDALIS, Ad. & Ang. (Pl. XXXVII. fig. 3.)

O. *testa turrito-fusiformi, spira elata, pallide cinerea, maculis rufo-fuscis in fasciis transversis dispositis ornata (in anfractu ultimo tribus), suturis canaliculatis; apertura angusta; columella alba, antice uniplicata.*

Long. 5 lines, lat. 1¼ line.

Hab. Port Jackson, 5 fathoms (*Coll. Angas.*).

A small species, remarkable both for the elegance of its form and the beauty of its markings.

6. OLIVELLA LEUCOZONA, Ad. & Ang. (Pl. XXXVII. fig. 23.)

O. *testa turrito-fusiformi, spira elata, cinerea, lineis rufo-fuscis angulatis longitudinalibus reticulata, maculis albis rufisque alternantibus ad suturas ornata, suturis profunde canaliculatis; anfractu ultimo fascia transversa cæruleo-alba antice succincto, ad basin castaneo cincto; apertura angusta, intus fulva; columella fusca, antice uniplicata.*

Long. 7 lines, lat. 2 lines.

Hab. Port Jackson, 6 fathoms (*Coll. Angas.*).

Most nearly resembling in form *O. fulgida*, Rve., but very prettily reticulated with red-brown zigzag lines, and with a transverse bluish-white zone at the fore part of the last whorl.

7. OLIVELLA NYMPHA, Ad. & Ang.

O. *testa fusiformi-turrita, gracili, spira elata, suturis profunde canaliculatis, alba, semipellucida, zonula alba opaca ad suturas ornata; apertura angusta, antice effusa; columella alba, opaca, antice uniplicata.*

Long. 5 lines, lat. $1\frac{1}{4}$ line.

Hab. Port Stephens, New South Wales, 5 fathoms (*Coll. Angas.*).

A delicate semiopake-white slender species, with the aperture peculiarly effuse anteriorly.

8. Ruma rhodocheila, Ad. & Ang.

R. *testa late ovata, rimata; spira parva, acuta; violascente tincta, alba, epidermide tenui pallide straminea induta, transversim tenuissime striata; apertura ovata, patula; labio reflexo, umbilicum obtegente, rufo-violascente tincto; labro simplici, arcuato, acuto.*

Long. 1 inch 7 lines, lat. 1 inch 3 lines.

Hab. New Caledonia (*Coll. Angas.*).

A pallid ovate species, with a patulous aperture, and with the inner lip stained with reddish violet.

9. Amauropsis moerchi, Ad. & Ang.

A. *testa ovata, spira elata, apice peracuto imperforato, epidermide olivacea obtecta; anfractibus 7, convexiusculis, ad suturas obtuse angulatis; apertura ovata; labio callo tenui albo induto, columella antice reflexa; labro postice vix angulato, margine acuto.*

Long. 5 lines, lat. 3 lines.

Operculum tenue, corneum, subspirale.

Hab. Watson's Bay, Port Jackson, under stones, low water (*Coll. Angas*).

A dark brown Vivipara-like shell, with a very acute spire, and with the whorls obtusely angulate at the sutures.

III. Gasteropoda rostrifera.

It is our intention in a future paper to examine critically the Rostriferous Gasteropods of Australia; meanwhile we have to describe a new genus allied to *Fossar*, and an *Adeorbis* of larger size than usual, and of great beauty.

Genus Fossarina, Ad. & Ang.

Testa turbinata, depressa, variegata, late umbilicata; anfractibus spiraliter costatis; apertura circulari, magna, intus non margaritacea; labio arcuato, simplici.

Operculum corneum, subspirale.

This genus constitutes a peculiar littoral form allied to *Fossar*, from which it differs in the curvature of the inner lip and circular aperture. It may be known from *Conradia* by its Stomatelliform character, and from *Isapis* in the inner lip not being furnished with a tooth. In general appearance it reminds one of *Vanicoro*; but the shell is variegated, and the texture is entirely different. *Fossar variegatus*, A. Ad., is a second species.

1. Fossarina patula, Ad. & Ang. (Pl. XXXVII. figs. 9, 10.)

F. *testa turbinata, depressa, late umbilicata, spira parva, sordide alba, nigro-fusco sparsim maculata; anfractibus 3, convexis, ultimo magno transversim valde lirato, liris granulosis majoribus cum minoribus alternantibus, ad basin simplicibus; umbilico margine acute carinato; apertura orbiculari, ampla; labio arcuato, margine convexo, simplici; labro margine acuto, postice dilatato, ascendente.*

Long. 3 lines, lat. 2½ lines.

Hab. Port Jackson, under stones, low water (*Coll. Angas.*).

Two specimens only of this peculiar form were obtained during an unusually low tide, adhering to the under surface of stones, at Watson's Bay, Port Jackson.

2. Adeorbis angasi, A. Ad. (Pl. XXXVII. figs. 11, 12.)

A. *testa valde depresso-conica, late umbilicata, alba, tenui, semipellucida; anfractibus rapide accrescentibus, ultimo magno, convexo, concentrice striato, radiatim obsolete plicato, ad suturam crenulato, ad peripheriam acute angulato et concinne crenato, ad basin radiatim corrugato-plicato; apertura semiovata; labio rectiusculo, acuto; labro postice ascendente.*

Long. 3 lines, lat. 2½ lines.

Hab. Coodgee Bay, outside Port Jackson Heads (*Coll. Angas.*).

[I have dedicated this unique and lovely species to my friend and coadjutor, who has laboured so assiduously and so successfully in extending our knowledge of the Australian Molluscan fauna.—A. A.]

3. Vanicoro recluziana, Ad. & Ang.

V. *testa turbinata, late umbilicata, alba, spira parva; anfractibus 3½, longitudinaliter obsolete plicatis, transversim crebre liratis; umbilico profundo, perspectivo, periomphalo valde angulato; apertura semiovata, patula.*

Long. 5 lines, lat. 4 lines.

Hab. Port Jackson, under stones, low water (*Coll. Angas.*).

A species with the whorls finely lirate, and with the margin of the umbilicus strongly angulate.

IV. Mollusca conchifera.

To the known Bivalves of Australia we have been fortunate in adding a fine ventricose *Dosinia*, a lovely *Sunetta*, allied to *S. excavata*, Hanl., from Japan, an interesting thin inflated species of *Naranio*, two large and showy *Lucinæ*, a splendid *Pecten* from Tasmania, two large *Nuculæ*, and two *Crassatellæ* of great beauty.

1. Dosinia diana, Ad. & Ang.

D. *testa orbiculato-cordata, gibba, subæquilaterali, nivea, lunula lata profunde impressa, area cardinali postica marginibus rotundatis, umbonibus perlæcibus, superficie valvarum concinne crebre concentrice lirata, margine ventrali regulariter arcuato.*

Alt. 1¾ inch, lat. 1 inch 10 lines.

Hab. Hardwick Bay, Spencer's Gulf, South Australia (*Coll. Angas.*).

A pure-white gibbous species, very smooth towards the beaks, and most nearly resembling *D. japonica*, but with the edges of the posterior hinge-area rounded, and not angulate and lamellar.

2. Sunetta aliciæ, Ad. & Ang. (Pl. XXXVII. fig. 18.)

S. *testa ovato-cordata, vix æquilaterali, latere postico latiore et rotundato, antico angustiore; albida, lineis roseis undulatis et angulatis reticulata et pallide purpurascenti-rosaceo radiata, intus carneola et pallide luteo tincta, margine intus crebre crenulato.*

Alt. 1 inch, lat. 13 lines.

Hab. Encounter Bay, South Australia (*Coll. Angas.*).

In some examples the colour is almost entirely purplish, and painted with darker rays of the same colour. This lovely species is named after the wife of one of the authors, who has rendered valuable assistance to her husband in his conchological researches in the Australian continent.

3. Naranio rubiginosa, Ad. & Ang. (Pl. XXXVII. fig. 17.)

N. *testa transversim ovata, subobliqua, tenui, ventricosa, rubiginosa, fusco-purpurascente obsolete radiata, ad latera et marginem ventralem pallida; umbonibus parvis, acutis, incurvatis; superficie vulvarum lineis elevatis divaricatis radiantibus confertis corrugatis irregularibus tota insculpta; latere antico breviore, rotundato; margine postico declivi, ventrali regulariter arcuato.*

Alt. 8 lines, lat. 10 lines.

Hab. Port Jackson, 4 fathoms, enclosed in a nodule of clay (*Coll. Angas.*).

An interesting addition to the limited genus *Naranio* of Gray, having the characteristic divaricate sculpture of that group. It is a thin delicate ventricose shell, of a reddish colour, faintly rayed with brownish purple.

4. Hiatula montrouzieri, Ad. & Ang.

H. *testa transversim ovata, inæquilaterali, utrinque hiante, latere antico breviore vix producto, postico longiore subrostrato, flexuoso, ad extremitatem rotundato; superficie valvarum epidermide olivacea induta, concentrice rugoso-plicata, porca obtusa ab umbonibus ad marginem ventralem extendente; margine ventrali arcuato, postice subsinuato.*

Alt. 1 inch 3 lines, lat. 2 inches.

Hab. New Caledonia (*Coll. Angas.*).

We have much pleasure in naming this species in compliment to M. Montrouzier, so well known for his investigations into the conchology of New Caledonia.

5. SEMELE CRENATA, Ad. & Ang.

S. *testa transversim ovata, subdistorta, gibba, sordide alba, concentrice lamellosa, marginibus lamellarum incrassatis et crenatis, interstitiis cancellatis, latere antico rotundato, postico subsinuato, margine ventrali flexuoso.*

Alt. 7 lines, lat. 9 lines.

Hab. Moreton Bay (*Coll. Angas.*).

A species most resembling in form *S. rupium*, Sow., but with the edges of the concentric lamellæ thickened and very beautifully crenate.

6. SEMELE ADA, Ad. & Ang.

S. *testa transversim ovata, subæquilaterali, compressa, umbonibus acutis, area cardinali antica excavata, latere antico rotundato, postico obtuse angulato; albida, epidermide fusca fugacea tenui obtecta, concentrice rugoso-plicata, margine ventrali arcuato.*

Alt. 4½ lines, lat. 6 lines.

Hab. Port Adelaide Creek, 3 fathoms (*Coll. Angas.*).

A small compressed plicate species, with the anterior hinge-area excavated.

7. LUCINA CONCENTRICA, Ad. & Ang. (Pl. XXXVII. fig. 19.)

L. *testa orbiculari, subæquilaterali, gibbosa, solida, alba, concentrice lamellosa; lamellis costiformibus, vix elatis, æqualibus, subdistantibus, interstitiis obsolete radiatim liratis; lunula parva, angusta; margine ventrali crenulato.*

Alt. 11 lines, lat. 11 lines.

Hab. St. Vincent's Gulf, South Australia (*Coll. Angas.*).

This species appears to combine the characters of *Cyclas* of Klein and *Lucina* proper, having the equilateral orbicular shape of the former and the concentric sculpture of the latter. It is a solid, white, gibbous species, with the edges of the valves finely crenate.

8. LUCINA (CYCLAS) CUMINGI, Ad. & Ang. (Pl. XXXVII. fig. 20.)

L. *testa orbiculari, æquilaterali, solida, gibbosa, alba, lateribus subdilatatis; superficie valvarum divaricatim valde insculpta; liris divaricatis, acutis, imbricatis, subdistantibus, antice abrupte desinentibus; margine ventrali integro.*

Alt. 1½ inch, lat. 1 inch 7 lines.

Hab. St. Vincent's Gulf, South Australia (*Coll. Angas.*).

A large, handsome species, with traces of a thin light-brown epidermis on the lateral margins of the valves. The divaricating ridges are acute and imbricate upwards, and are wider apart than in most other species of this group, which has been named *Cyclas* by Klein. The *Cyclas* of Lamarck is the *Sphærium* of Scopoli.

9. CRASSATELLA AURORA, Ad. & Ang. (Pl. XXXVII. fig. 15.)

C. *testa transversim ovata, compressa, subæquilaterali, utrinque*

rotundata, pallide luteo-fusco seu carneo tincta et fasciis duabus castaneis interruptis ornata, areis cardinis anticis et posticis maculis sanguineis tinctis; superficie valvarum concentrice plicata, plicis parvis confertis; margine ventrali regulariter arcuato.

Alt. 8 lines, lat. 11 lines.

Hab. Banks's Straits, Tasmania; Commodore Loring, H. M. S. 'Iris' (*Coll. Angas.*).

This charming species is of a compressed ovate form, and of a pale fulvous colour, delicately marked with chestnut and crimson.

10. Crassatella banksii, Ad. & Ang. (Pl. XXXVII. fig. 16.)

C. *testa trigonali-ovata, compressa, subæquilaterali, latere antico rotundato, postico subangulato, carnea, ad umbones albida, fasciis duabus fulvis radiantibus ornata; superficie valvarum concentrice plicata, plicis ad latus posticum angulatis; margine ventrali arcuato.*

Alt. 5 lines, lat. 8 lines.

Hab. Banks's Straits, Tasmania (*Coll. Angas.*).

This species is of a pale flesh-colour, fading into white towards the beaks, and with two yellowish-brown bands radiating from the beaks to the ventral margin.

11. Nucula consobrina, Ad. & Ang.

N. *testa cuneato-ovata, obliqua, solida; latere antico breviore, area cardinali postica in medio elata; latere postico longiore, rotundato; margine postico declivo; superficie valvarum liris concentricis subcrenulatis obsoletis interdum validis et crenatis ornata, epidermide pallide fusco-olivacea induta; margine ventrali concinne crenulato.*

Alt. 3 lines, lat. 4 lines.

Hab. New South Wales (*Coll. Angas.*).

This species is most nearly allied to *N. pisum*, Sow., from Chili, but is less oblique. The style of sculpture varies, the concentric ridges being sometimes very conspicuously crenate.

12. Nucula loringi, Ad. & Ang.

N. *testa transversa, ovata, inæquilaterali, subcompressa; latere antico breviore, producto in medio, area cardinali antica excavata; latere postico longiore, rotundato, superne vix producto, area cardinali postica elata; pallide olivaceo-viridi, ad umbonibus margaritacea; margine ventrali arcuato, intus simplici.*

Alt. 5 lines, lat. 7½ lines.

Hab. Keppel Bay; Commodore Loring, H. M. S. 'Iris' (*Coll. Angas.*).

This species somewhat resembles *N. cumingii*, but the sides of the valves are more produced. We have dedicated it to Commodore Loring, whose exertions in the cause of science have added many new species to the Molluscan fauna of Australia.

13. PECTEN TASMANICUS, Ad. & Ang. (Pl. XXXVII. fig. 21.)

P. *testa trigonali-orbiculari, subæquivalva; valva dextra convexiore, auribus æqualibus; valva sinistra roseo-violascente tincta, costis* 8 *radiantibus validis plus minusve longitudinaliter sulcatis et costellis parvioribus intermediis inæqualibus instructa, superficie tota minute granulata; valva dextra pallida, radiatim costata, costis in* 7–8 *fasciculis dispositis, interstitiis costis minoribus instructis.*

Alt. 2 inches 2 lines, lat. 2 inches 1 line.

Hab. Oyster Bay, Tasmania (*Coll. Angas.*).

A fine species, with the ribs of the right valve disposed in seven or eight bundles, and with the entire surface of the shell shagreened as in *P. bifrons*.

EXPLANATION OF PLATE XXXVII.

Fig. 1. *Fusus tasmaniensis*, p. 421.
2. *Adamsia adelaidæ*, p. 421.
3. *Olivella pardalis*, p. 422.
4. *Cithara angela*, p. 419.
5. *C. compta*, p. 419.
6. *C. bella*, p. 419.
7. *Mangelia picta*, p. 419.
8. *M. insculpta*, p. 420.
9, 10. *Fossarina patula*, p. 424.
11, 12. *Adeorbis angasi*, p. 424.
13. *Euryta trilineata*, p. 418.
Fig. 14. *Euryta pulchella*, p. 418.
15. *Crassatella aurora*, p. 426.
16. *C. banksii*, p. 427.
17. *Naranio rubiginosa*, p. 425.
18. *Sunetta aliciæ*, p. 425.
19. *Lucina concentrica*, p. 426.
20. *L. cumingi*, p. 426.
21 *a*, *b*. *Pecten tasmanicus*, p. 428.
22. *Purpura flindersi*, p. 421.
23. *Olivella leucozona*, p. 422.

12. DESCRIPTIONS OF NEW SPECIES OF SHELLS, CHIEFLY FROM THE CUMINGIAN COLLECTION. BY HENRY AND ARTHUR ADAMS.

1. RIMELLA SPECIOSA, H. & A. Ad.

R. *testa ovato-fusiformi, fulvicante; anfractibus convexis, supremis utrinque varicosis, longitudinaliter concinne plicatis, plicis confertis regularibus, interstitiis transversim sulcatis; apertura angusta, rostro brevi truncato, postice canali usque ad anfractum penultimum extendente et deorsum inclinato; labio lævi, tenui; labro margine reflexo, intus creno-plicato, antice simplici.*

Long. 12 lines, lat. 5 lines.

Hab. ——? (*Coll. Tyler.*).

An elegant reticulated shell, more lanceolate than *R. cancellata*, not ending anteriorly in a recurved beak, with the varix of the outer lip plain externally, and with the posterior canal of the aperture faintly developed, and only extending as far as the penultimate whorl.

2. RIMELLA TYLERI, H. & A. Ad.

R. *testa ovato-fusiformi, lutescente, fasciis transversis quatuor rufo-fuscis ornata; anfractibus convexis, longitudinaliter plicatis; plicis validis subdistantibus, interstitiis transversim valde sulcatis; apertura angusta, rostro acuto subproducto, postice canali usque ad anfractum tertium extendente et deorsum valde curvato; labio lævi,*

valde incrassato; labro margine varicoso, intus corrugato-plicato, antice dente valido acuto instructo.

Long. 10 lines, lat. 4 lines.

Hab. China Sea (*Coll. Tyler.*).

A very pretty species, with four transverse red-brown bands on the last whorl, and with a conspicuous sharp tooth at the fore part of the outer lip.

3. Tudicla (Tudicula) spinosa, H. & A. Ad.

T. *testa turbinata, alba, solida; spira brevi, depresso-conica, apice papilloso; anfractibus 5, planis, transversim liratis, liris nonnullis validioribus longitudinaliter oblique striatis, ad suturas undulatis et spinulosis; anfractu ultimo plicis longitudinalibus et ad peripheriam squamulis spiniformibus instructo, transversim valde lirato, lirulis intermediis ornato; apertura ovata; labio antice plicis tribus validis instructo, canali recto valde producto; labro intus valde sulcato.*

Hab. Port Curtis (*Coll. Cuming.*).

This species and *T. armigera*, A. Ad., have spiny varices and three transverse plaits on the columella. They form a peculiar group near *Turbinella*, for which we propose the name of *Tudicula*.

4. Peristernia luculenta, H. & A. Ad.

P. *testa ovato-fusiformi, solida, umbilicata, alba, fascia lata transversa pallide carnea in medio anfractuum ornata; anfractibus 8, postice excavatis, longitudinaliter plicatis, plicis convexis, distantibus, postice acute nodulosis, suturis maculis rufescentibus obliquis linearibus ornatis, transversim liratis, liris elatiusculis distantibus filosis, antice sex validioribus valde punctatis, rufo-fuscis, interstitiis regulariter transversim striatis; apertura acuminato-ovata; labio lævi, plica antica obliqua instructo, canali mediocri, valde recurvo; labro intus lævi, margine postice subangulato.*

Hab. Gulf of Mexico (*Coll. Cuming.*).

A very handsome species, white, with a broad flesh-coloured band in the middle of the nodosely-plicate whorls, and with a series of rufous-dotted spiral liræ at the fore part of the last whorl.

5. Trophon spiratum, H. & A. Ad.

T. *testa ovato-fusiformi, tenuicula, cinerea, spira elata; anfractibus postice angulatis, varicibus tenuibus longitudinalibus permultis et liris transversis validis subconfertis cancellatis; apertura ovata, in canalem mediocrem apertum vix recurvatum desinente; labio subcalloso; labro tenui, intus sulcato, margine postice angulato.*

Long. 46 m., lat. 23 m.

Hab. New Zealand (*Coll. Cuming.*).

A cancellate species, with spirate whorls, and with the aperture ending in a short open canal.

6. Trophon coronatum, H. & A. Ad.

T. *testa ovato-fusiformi, tenui, cretacea, alba, spira mediocri; an-*

fractibus postice angulatis, varicibus laciniatis distantibus postice ad angulos in seriem spinarum squamiformium productis, interstitiis lævibus, anfractu ultimo ventricoso, in rostrum elongatum rectum desinente, rostro ad extremitatem recurvo; apertura ovata, quam spira longiore; labio lævi, simplici, canali aperto.

Long. 45 m., lat. 17 m.

Hab. New Zealand (*Coll. Cuming.*).

An elegant species, with coronate whorls and a very long straight beak.

7. PSEUDOLIVA (MACRON) COMMODA, H. & A. Ad.

P. *testa ovato-fusiformi, epidermide fusca velutina incrassata obtecta; spira aperturam æquante; anfractibus 5, convexiusculis, transversim obsolete liratis, ultimo elongato antice sulco profundo spirali in dentem brevem desinente instructo, sulcis tribus spiralibus ad basin ornato, regione umbilicali impresso, lira valida spirali circumcincto; apertura ovata, intus fusca; labio albo, crasso, convexo, superne callo instructo, inferne subtortuoso; labro intus lirato, margine acuto, intus albo.*

Hab. ——? (*Coll. Tyler.*).

This curious shell belongs to the same group to which *P. kellettii*, A. Ad., belongs, and to which the name *Macron* has been given by the authors.

8. CANTHARUS PORCATUS, H. & A. Ad.

C. *testa ovato-fusiformi, epidermide fusco-olivacea obtecta; anfractibus sex, convexis, transversim valde porcatis, porcis elatis convexis distantibus, interstitiis longitudinaliter striatis; apertura ovata, intus alba; labio arcuato, superne callo parvo instructo, antice subtruncato, canali elongato subreflexo ad sinistram inclinato.*

Long. $\frac{3}{4}$ in.

Hab. New Hebrides (*Coll. Tyler.*).

A very peculiar and well-marked species, covered with a thick dark olivaceous epidermis, and belonging to the group of *Cantharus* proper.

9. VITULARIA CANDIDA, H. & A. Ad.

V. *testa ovata, solida, candida, spira elata; anfractibus convexis, postice subangulatis, varicibus tenuibus ad angulos productis (in anfractu ultimo sæpe obsoletis) instructis, interstitiis transversim liratis; apertura ovata, postice vix canaliculata, antice in canalem recurvatum vix clausum desinente; labio crasso, calloso; labro intus sulcato, margine denticulato.*

Long. 35 m., lat. 18 m.

Hab. New Zealand (*Coll. Cuming.*).

A fine pure-white species, very variable in its characters, the varices being often obsolete.

10. CAMPULOTUS CUMINGII, H. & A. Ad.

C. *testa turbinata, anfractu ultimo in tubum elongatum porrecto,*

alba, solida, transversim lirata, liris æqualibus distantibus validis imbricato-lamellosis, interstitiis lamellis transversis imbricatis confertis undulosis instructis; regione umbilicali, vel interna, transversim valde corrugato-plicata; apertura trigonali-ovata.

Hab. ——? California (*Coll. Cuming.*).

This species differs from *C. antiquus* in being conspicuously transversely lirate. On account of the last whorl being so greatly produced, the ridges appear to be longitudinal, but in reality they cross the last whorl transversely.

11. Latiaxis tortilis, H. & A. Ad.

L. *testa ovato-fusiformi, umbilicata, alba, spira aperturam æquante; anfractibus* 6, *postice angulatis spiratis, longitudinaliter plicatis, plicis undulatis distantibus, transversim liratis, liris pulcherrime squamulosis æqualibus, carina prominula squamulosa undulata rotundata in medio anfractuum; apertura trigonali-ovata; labio lævi, convexo; labro intus valde lirato, in medio angulato, canali elongato ad dextram inclinato; umbilico mediocri, periomphalo squamoso.*

Hab. China.

A beautiful species, very similar to *L. pagodus*, Jonas; but the whorls are longitudinally plicate, and the conspicuous squamulose carina is undulated. The colour also is pure white, instead of fulvous, and the aperture is violet.

12. Coralliophila asperrima, H. & A. Ad.

C. *testa ovato-fusiformi, umbilicata, alba, spira aperturam æquante; anfractibus* 7, *convexiusculis, longitudinaliter plicatis, plicis obliquis rotundis, transversim liratis, liris lamellatis serrulatis, interstitiis lirulis interpositis duabus instructis; apertura acuminato-ovata; labio lævi, convexo; labro intus lirato.*

Hab. ——?

A species most nearly resembling *C. scalariformis*, Lam. The transverse lamellæ are serrulate, giving the entire surface of the shell a very hispid appearance.

13. Coralliophila salebrosa, H. & A. Ad.

C. *testa acuminato-ovata, subumbilicata, alba; anfractibus* 5, *planis, in medio angulatis, longitudinaliter plicatis, plicis rotundatis distantibus, transversim liratis, liris squamulosis duabus in medio anfractuum elatioribus, anfractu ultimo antice liris* (*circa* 6) *transversis validis squamulosis ornato; apertura trigonali-ovata; labio lævi, recto, convexo, canali recto mediocri lato; labro intus lævi.*

Hab. Guadeloupe (*Mus. Cuming.*).

A handsome species, having somewhat the form of a *Vitularia*.

14. Coralliophila nodulosa, H. & A. Ad.

C. *testa ovato-pyriformi, umbilicata, alba, spira quam apertura breviore; anfractibus* 5, *spiratis, postice obtuse angulatis, longitudi-*

naliter plicatis, transversim liratis, anfractu ultimo liris duabus validis nodulosis ad plicas instructo, plicis brevibus lamellosis ad margines subserrulatis; apertura trigonali-ovata; labio lævi, simplici, canali mediocri antice acuminato; labro intus lirato, margine postice rotundato-angulato.

Hab. Guadeloupe (*Mus. Cuming.*).

A beautiful, small, nodulose species, with an elaborate style of sculpture.

15. CORALLIOPHILA SENTICOSA, H. & A. Ad.

C. *testa acuminato-ovata, umbilicata, spira acuta elata, alba, antice rufo tincta; anfractibus 8, longitudinaliter plicatis, plicis rotundatis confertis, transversim liratis, liris late lamellosis, marginibus lobatis et acute laciniatis; apertura ovata, antice producta, canali recto, subelongato, reflexo; umbilico parvi, carina squamulosa rufa circumcincto; labro margine aculeato-crenato.*

Hab. Bombay (*Mus. Cuming.*).

A singular species, with elevated acute spire and transverse broadly lamellar liræ, which are acutely laciniated at their free margins.

16. CORALLIOPHILA UNDOSA, H. & A. Ad.

C. *testa ovato-conoidali, solida, umbilicata, alba, spira aperturam æquante; anfractibus 5, planis, longitudinaliter plicatis, plicis rotundatis undulatis obliquis, in medio incrassatis, antice attenuatis, transversim liratis, liris lamellosis, ad margines aculeato-crenatis, majoribus cum minoribus alternantibus; apertura trigonali-ovata; labio lævi, convexo; labro intus valde sulcato, postice obtuse angulato; umbilico mediocri, carina squamosa circumcincto.*

Hab. Sandwich Islands (*Coll. Cuming.*).

A pure white species, with undulate plicæ and lamellar liræ, finely aculeately crenate at the margins.

17. CORALLIOPHILA CONFRAGOSA, H. & A. Ad.

C. *testa elongato-ovata, solida, umbilicata, spira quam apertura breviore, alba; anfractibus 5, planis, longitudinaliter plicatis, plicis crassis æqualibus duabus validioribus in medio anfractuum, aculeato-squamosis, interstitiis cavernose excavatis; apertura elongato-ovata; labio lævi, antice subdilatato, porcis quatuor transversis elatis instructo, canali recto subproducto; labro intus tuberculatim lirato; umbilico parvo, carina squamosa circumcincto.*

Hab. ——? (*Coll. Cuming.*).

A white rugose shell, having somewhat the aspect of a *Vitularia*.

18. CORALLIOPHILA RETUSA, H. & A. Ad.

C. *testa globoso-ovata, solida, umbilicata, pallide carnea, spira retusa; anfractibus 5, planis, longitudinaliter oblique plicatis, plicis rotundatis regularibus, transversim valde liratis, liris rugulosis confertis; apertura ovata; labio convexo, antice transversim rugoso-plicato; labro intus valde sulcato, margine crenulato.*

Hab. ——? (*Mus. Cuming.*).

This is a very solid species, of a pale flesh-colour, and with a very obtuse spire. It has somewhat the appearance of a monstrosity, but we are unable to refer it to any known species.

19. CORALLIOPHILA ELABORATA, H. & A. Ad.

C. *testa ovato-conica, solida, umbilicata, alba, rufo subtincta; anfractibus 6, planis, oblique longitudinaliter plicatis, plicis convexis obtusis latis confertis, transversim liratis, liris undulatis validis regularibus lamellatis squamulis imbricatis margine biserrato ornatis; apertura ovata; labio lævi, intus lirato; umbilico latiusculo, carina squamosa valida circumcincto.*

Hab. Sandwich Islands (*Coll. Cuming.*).

A solid white Buccinoid shell, with very elaborate sculpture; the scales of the transverse liræ are produced and aculeate on each side, making the liræ biserrate, and giving the entire shell an extremely beautiful appearance.

20. MINOLIA TIGRINA, H. & A. Ad.

M. *testa globoso-conica, perspective umbilicata; anfractibus 5½, lævibus, supremis bicingulatis, ultimo multicingulato, cingulis superioribus validioribus, ad basin confertis minoribus, umbilico intus liris concentricis crenulatis instructo; apertura subquadrato-orbiculari; labio rectiusculo; labro margine postice subangulato; alba, strigis fuscis latis undulatis longitudinalibus concinne picta.*

Hab. ——? (*Coll. Tyler.*).

This is a very charming species, belonging to the Solariform *Margaritæ*—a southern group which has been named *Minolia*.

21. STOMATELLA DELICATA, H. & A. Ad.

S. *testa orbiculato-conica, imperforata, spira elatiuscula, niveo et pallido viridi variegata, sanguineo sparsim guttata, transversim lirata, liris prominentibus distantibus; anfractibus superioribus unicarinatis; apertura ovata, obliqua, intus alba.*

Hab. St. Thomas (*Coll. Cuming.*).

A delicate species, varied with snow-white and pale green, with a few blood-red spots.

22. STOMATELLA MODESTA, H. & A. Ad.

S. *testa subcirculari, imperforata, depressa, spira parva; anfractibus convexis, transversim liratis, liris inæqualibus griseo articulatis, nonnullis validioribus; apertura ovata, obliqua, intus vivide iridescenti-albida, griseo nebulosa.*

Hab. ——. ? Red Sea (*Coll. Cuming.*).

A neat lirate species, clouded with pale grey, and a few darker blotches at the sutures.

23. STOMATELLA ELATA, H. & A. Ad.

S. *testa orbiculato-conica, imperforata, spira elata, albida, ad suturas fusco radiatim picta, ad peripheriam maculis fuscis subquadratis*

ornata, transversim lirata, liris inæqualibus fusco articulatis; apertura subcirculari; labio subcalloso, reflexo.

Hab. ——? (*Coll. Cuming.*).

A prettily marked species, with an elevated conical spire, and with the inner lip reflexed and callous.

24. STOMATELLA CALIGINOSA, H. & A. Ad.

S. *testa auriformi, imperforata, oblonga, nigricante, spira parva, transversim lirata, liris majoribus cum minoribus alternantibus, obsolete albido articulatis; apertura oblonga, perobliqua, intus viridescenti-alba, margine nigro crenulata; labio planiusculo, rima umbilicali anguste lunari.*

Operculum tenue, orbiculare, multispirale.

Hab. ——? (*Coll. Cuming.*).

A brownish-black lirate auriform species, more resembling a *Gena*, but with the operculum of *Stomatella*.

25. DIALA LIRATA, H. & A. Ad.

D. *testa turrita, rimata, semipellucida, alba; anfractibus* 6, *convexis, postice subangulatis, lineis longitudinalibus et liris validioribus transversis obsolete cancellatis; apertura rotundato-ovata, antice vix effusa.*

Hab. ——? (*Coll. Tyler.*).

A neatly fashioned, white, semipellucid species, with the whorls obscurely cancellated. This and the species described below belong to the section of *Alaba* in which the whorls are not variced.

26. DIALA NODICINCTA, H. & A. Ad.

D. *testa ovato-conica, rimato-umbilicata, alba, subdiaphana; anfractibus* $4\frac{1}{2}$, *postice angulatis, carina nodulosa concinne ornatis, anfractu ultimo vix sejuncto; apertura rotundato-ovata; peritremate acuto, continuo.*

Hab. ——? (*Coll. Tyler.*).

A very pretty species, with the whorls posteriorly angulate, and encircled with a row of nodules.

27. POMPHOLYX LEANA, H. & A. Ad.

P. *testa helicoidea, depressa, tenui, epidermide viridi obtecta, spira parva; anfractibus* $2\frac{1}{2}$, *convexis, rapide accrescentibus, ultimo permagno; apertura patula; labio planiusculo, arcuato; labro simplici, acuto.*

Alt. $1\frac{1}{4}$ line, lat. $2\frac{1}{2}$ lines.

Hab. West Columbia (*Coll. H. Adams.*).

This is a second species of *Pompholyx*, and differs from *P. effusa*, Lea, in being thinner and smaller, in the spire being more elevated, and in the aperture not being so produced anteriorly.

28. ASSIMINEA LATERICEA, H. & A. Ad.

A. *testa ovato-conoidali, solidiuscula, latericea; anfractibus* $5\frac{1}{2}$,

planiusculis, infra suturas pallidioribus, anfractu ultimo magno; apertura ovata, antice producta, regione umbilicali impressa; labio effuso, subcalloso.

Hab. Banks of the Yang-tsze-kiang and Peiho.

A large brickdust-red species, very like *A. bridgesi*, Pfr., from South America, but more ovate and less conoidal in form.

29. Modiolarca exilis, H. & A. Ad.

M. *testa parva, ovato-trigonali, vix compressa, rubra, nitida, sæpe atro-purpurea, latere antico brèviore subangulato, postico longiore rotundato; margine ventrali arcuato, postice subsinuoso.*

Alt. 1¼ line, lat. 2 lines.

Hab. Found floating, attached to *Fucus*, near the Falkland Islands (*Coll. H. Adams.*).

A shining red or purple, ovately triangular species, and with the ventral margin sinuated at the hind part.

30. Modiolarca pusio, H. & A. Ad.

M. *testa parva, ovato-trapezoidali, sordide alba, epidermide concentrice lamellosa obtecta, latere antico brevissimo subtruncato, postice producto rotundato; margine ventrali subrecto.*

Alt. 1 line, lat. 2½ lines.

Hab. Found floating, with the preceding, off the Falkland Islands (*Coll. H. Adams.*).

Modiolarca pusilla, Gould, Exp. Shells, pl. 44. fig. 585, is oblong in form, the greatest diameter being from beak to ventral margin.

13. Remarks on the Exhibition of a Natural Mummy of Alca impennis. By Alfred Newton, M.A., F.L.S., F.Z.S.

For the last twenty-one years, since the appearance of the part of Mr. Yarrell's 'History of British Birds' containing his account of *Alca impennis*, wherein was cited Mr. Audubon's statement that that species bred on an island in the neighbourhood of Newfoundland, the attention of ornithologists in this country has been more or less directed to that colony, in the hope of obtaining thence specimens of this rare and curious bird. Mr. John Wolley, with his usual sagacity, applying the knowledge he had culled from his extensive researches among the works of our older naturalists, not only soon made out the truth of Willughby's supposition, "Penguin *nautis nostratibus dicta, quæ* Goifugel *Hoieri esse videtur*" (Ornithologia, Lond. 1676, p. 242), but found that the name was still persistent among those who were yet engaged in the Cod-fishery in the Newfoundland seas. Among his various memoranda I find one, apparently written about the year 1850, to this effect:—

"In Newfoundland, Funk or Penguin Isle is 170 miles north of St. John's, and about thirty-six miles north-east by east from Cape Freels, the north headland of Bonavista Bay. There are also Pen-

guin Isles two or three miles from shore; Penguin Islands, too, in the middle of the south coast of Newfoundland."

This note was evidently written after making a careful examination of the map; and I well remember, in February 1856, going over a chart of the North Atlantic with him, in which he had previously marked the various places known as "Penguin Island," "Bird Rock," and the like. To the best of my recollection, he also told me, either at the same or some former period, that in the course of his reading he had come across various notices of "Penguins," contained in the narratives of ancient voyages to that part of the world. All this time, however, I had not been altogether idle in the way of collecting (or at least seeking for) information on the subject. In the summer of 1853, as I have elsewhere stated*, a boatman at Torquay, then about seventy years of age, and by name William Stabb, told my brother Edward and myself that in former days he used to follow the Newfoundland Cod-fishery, and that he had seen Penguins off that coast. He added that they used to resort by hundreds to some islands there to breed, but were destroyed for their feathers, being driven up in a corner by people in boats. This practice, however, must have nearly or altogether ceased in his time; for he stated that he had never seen but two or three birds himself, and never a dead one. I mention these facts merely to show that Mr. Wolley's determination to work out the history of the Gare-Fowl, or Northern Penguin, was formed prior to his acquaintance with Professor Steenstrup's valuable discoveries, and to their publication in the elaborate and excellent article (Vidensk. Meddelelser, 1855, pp. 33-116) on this bird to which it always gives me so much pleasure to refer. When Mr. Wolley, later (in 1856), became aware of what that illustrious naturalist had ascertained, he was more than ever bent upon prosecuting his researches; and, acting upon the information I received from him, I at once set about doing what I could to further them†. Believing at the time that no example of the bird's skeleton existed in any of the European museums, and having great confidence in the trustworthiness of Herr Stuvitz's statements, as given by Professor Steenstrup (*loc. cit.*), that there were still many of its bones to be found on Funk Island, I began to address letters of inquiry respecting them to almost every one I could hear of in Newfoundland who seemed likely to be able to give assistance. I need not here go into details. For a long time I could get no response from any of those to whom I wrote; some of my epistles were returned to me through the dead-letter office; and occasionally I almost despaired of calling attention to the subject in that colony. At last I had the great pleasure of receiving from the clergyman of the Island of Fogo, the Rev. Reginald M. Johnson, a reply which in the most obliging terms promised me his valuable help in the matter. Still the chances of procuring specimens of bones that would really be serviceable towards determining the osteology of *Alca impennis* were not good. Though

* 'Zoology of Ancient Europe,' London and Cambridge, 1862, p. 30.
† Cf. 'The Ibis,' 1861, p. 397.

when Stuvitz, in 1841, visited Funk Island the bones were in quantities (*i Mængde*), many causes during the time that had since elapsed might have scattered or destroyed them. The locality, as I have before shown, was a distant one and, like all resorts of the Garc-Fowl as far as I know them, not easy of access. Stuvitz stated there were but two landing-places, and these only to be attained by a hazardous leap (*kun ved et voveligt Spring*). These latter particulars were confirmed by Mr. Johnson; and in the last letter which I had from that gentleman (only a few weeks ago) he told me he had come to the gallant determination to make the expedition himself, as without him he was sure all endeavours to obtain the bones would fail. Meanwhile the Bishop of Newfoundland, in the course of one of his visitations, had been shown by Mr. Johnson my letters, enclosing sketches of the principal bones and other papers relating to the subject, and most kindly volunteered to give me all the aid in the matter which his high position afforded. When the members of this Society know the result, I think they will congratulate me on my good fortune in having excited his lordship's interest. After several other friendly letters, I had three days ago the great pleasure of receiving one in which the Bishop informed me his success had surpassed anything I could have anticipated; for his lordship had done no less than secure me what may be not inaptly called the "mummy" of an *Alca impennis*, which, having come into my hands yesterday, I have now the honour of exhibiting to the Society.

It appears that the Colonial Government have recently conceded to a Mr. Glindon the privilege of removing the soil from Funk Island; for this soil, being highly charged with organic matter, is consequently valuable as manure when imported to Boston and other places in North America. The Bishop, through Mr. N. R. Vail, a gentleman of the United States, well informed on scientific subjects, and therefore aware of the interesting nature of the research, made application to the lessee of Funk Island, who ordered his men employed there to use their best endeavours to obtain for me bones of the Penguin. They appear to have done their work very effectually; for I hear that they "brought away many puncheons of bones and other remains"—of course not all necessarily "Penguins"—which I believe are now on their way to New England, where they will doubtless be readily bought up by the farmers, though I trust some may be rescued from ignoble uses by the American naturalists. This mummy, however, the Bishop tells me, was "found four feet below the surface, and under two feet of ice." I need scarcely point out to the Society what an advantage it is to have obtained so many bones undeniably belonging to one individual bird. Though the skeleton is not perfect, it is plain that we have here at least one side of the entire vertebral column. The extremities of the limbs are altogether wanting on either side; and though this is greatly to be regretted, it is some consolation to think that a knowledge of what these parts are like in *Alca impennis* may be, with a little trouble, supplied from almost every one of the sixty-three or sixty-four

stuffed skins at present known to exist*. I do not, however, mean to prolong these remarks by making any observations on the osteological structure of this bird. That I have reason to hope may be fully described by a far more able pen; for it is my intention to place the specimen I now exhibit in the hands of Professor Owen, trusting that he will make it the subject of one of those monographs which have so materially enriched our series of 'Transactions.' I have but to say in conclusion that, so far as I know, my "mummy" is, with one exception, the only approach to a complete skeleton existing in Europe. That exception is the specimen, nearly perfect, in the Osteological Gallery of the Museum of the Jardin des Plantes at Paris; for the remains of the two Gare-Fowls killed on Eldey in 1844, which were sent to Copenhagen, and are still preserved in the Physiological Museum of the University there, have been dissected with a view to show the different systems of organs; they are therefore even less available to determine the general osteology of the bird than are the various loose bones which, through Stuvitz's labours, exist in the Museums at Christiania and Copenhagen, that of our Royal College of Surgeons, and in my own collection.

November 24, 1863.

John Gould, Esq., F.R.S., in the Chair.

The Secretary exhibited a specimen of variegated wool from Ohio, forwarded by Mr. J. P. Hazard, of Philadelphia, through Mr. C. R. Weld, which seemed to show that the animal must have changed its colour some seven or eight times in the course of the year prior to its being clipped.

Professor Tennant exhibited a very perfect fossil egg of the *Æpyornis maxima*, lent to him for exhibition by M. J. F. Brunet. This egg, which measured 35 inches in larger by 29 in smaller diameter, was stated to have been obtained in Madagascar, "at a depth of 50 feet, in digging a mine of iron."

The Secretary read the following letter from Dr. J. Shortt, F.Z.S., relating to the fishing-propensities of the *Pteropus* of India:—

"Sir,—At about 6 P.M. on the 30th of April last, when at Con-

* Mr. Blyth, just six and twenty years ago, exhibited to this Society some bones which had been left in a preserved skin of this bird (P. Z. S. 1837, p. 122; and Ibis, 1861, p. 396, *note*). Within the last year, Mr. John Hancock extracted from his own beautiful specimen, and from the very ancient and interesting example in the Newcastle Museum, *every bone* they contained, without doing the slightest damage to the skins, as might be seen at the late Meeting of the British Association (*Cat. of Exhibition*, nos. 180, 185).

leeveram, my attention was attracted to a tank next the Dispensary, which, owing to a light shower of rain that had just fallen, literally seemed alive with small fish gambolling and jumping about in the water. There was nothing new in this; but my attention was drawn to a number of large birds with a somewhat heavy flight, hovering over the water and seizing with their feet the fish, with which they then made off to some tamarind-trees on the bund of the tank, to devour them at their leisure, I suppose.

"On a closer examination, I discovered that what I had imagined mere birds were none other than Flying Foxes, the *Pteropus edulis*. After watching them fishing for some time, I had to leave, owing to the darkness of the evening. I returned to the tank the next evening half an hour earlier, and again witnessed the same occurrence.

"I then got my assistant, Mr. Watson, to bring his gun and shoot some, so that I might satisfy myself as to the identity of these animals. Mr. Watson shot some two or three whilst in the act of seizing their fishy prey, and on examination I found them to be actually Flying Foxes. During a second visit, on the 5th and 6th of June, I observed the same thing occur again.

"I am not aware of the fishing-propensities of this animal ever having been noticed, for I find no account of them in any work on natural history that I have had opportunities of consulting on the subject. This habit of the Flying Fox appearing new to me, I send you this communication, as there may be others who have witnessed the same thing; and if made known, this would, I am sure, prove of interest to the naturalist.

"Chingleput, June 12th, 1863."

The Secretary regretted to have to state that one of the two *Didunculi* mentioned by him at the last Meeting as having been purchased at Sydney by Dr. G. Bennett for the Society was dead; but Dr. Bennett had promised to send home the dead specimen, as well as the remaining living bird, at the first suitable opportunity.

The Secretary also read the following extract from Dr. Bennett's latest letter (dated Sydney, Sept. 19th), respecting the Kagu of New Caledonia (*Rhinochetus jubatus*):—

"My young friend Mr. Ferdinand Joubert thus writes to me from 'Kai,' in the interior of New Caledonia, August 2nd, 1863:—

"'I see in the 'Sydney Herald' your article on the Kagu. I will send you some of the birds as soon as I can procure them, and also some nests and eggs, if pipes and tobacco can induce the natives to bring me some. The Kagus are rather plentiful here, on the side of the "Boh" Mountains, and the natives catch them to eat. Their way of doing this is by making a slipknot on a strong string; and having discovered a place frequented by these birds, they fasten the string in such a way that the birds when running along pass their heads or legs through the noose and are thereby captured. There are two kinds of Kagus, one very different from the other. The largest Kagu you last received from Dr. Segol is a female of the

"Bush-Kagu," and, as you have remarked, much handsomer than its fierce friend the smaller Kagu, which is the one with the dark stripes on the wings and tail (and generally of darker plumage). This is the "Grass-Kagu." These two kinds of Kagu do not associate together on good terms; and during the time I had them they were always fighting one with the other, the "Grass-Kagu" invariably getting the worst of the battle.

"'I will endeavour to procure a male and female of each species, and send them to you as soon as I can.'

"This fighting-propensity may in some degree account for the death of the little pugnacious Grass-Kagu soon after its arrival. It was found in a miserable half-starved condition when dissected; whilst the larger, elegant, and more peaceful 'Bush-Kagu' was in fine plumage, plump, and altogether in a healthy state, which continues to the present day.

"I have since written to Mr. F. Joubert, requesting him to send me as soon as possible a pair of skins of each species, male and female, properly labelled, and living specimens in pairs, as soon after as they can be procured, when I will transmit them to you immediately, so as to decide this interesting doubt on the subject of the existence of two species of this singular bird."

Mr. F. Buckland gave an account of his recent experiments in conveying a Porpoise (*Phocæna communis*) from the seaside to the Society's Gardens.

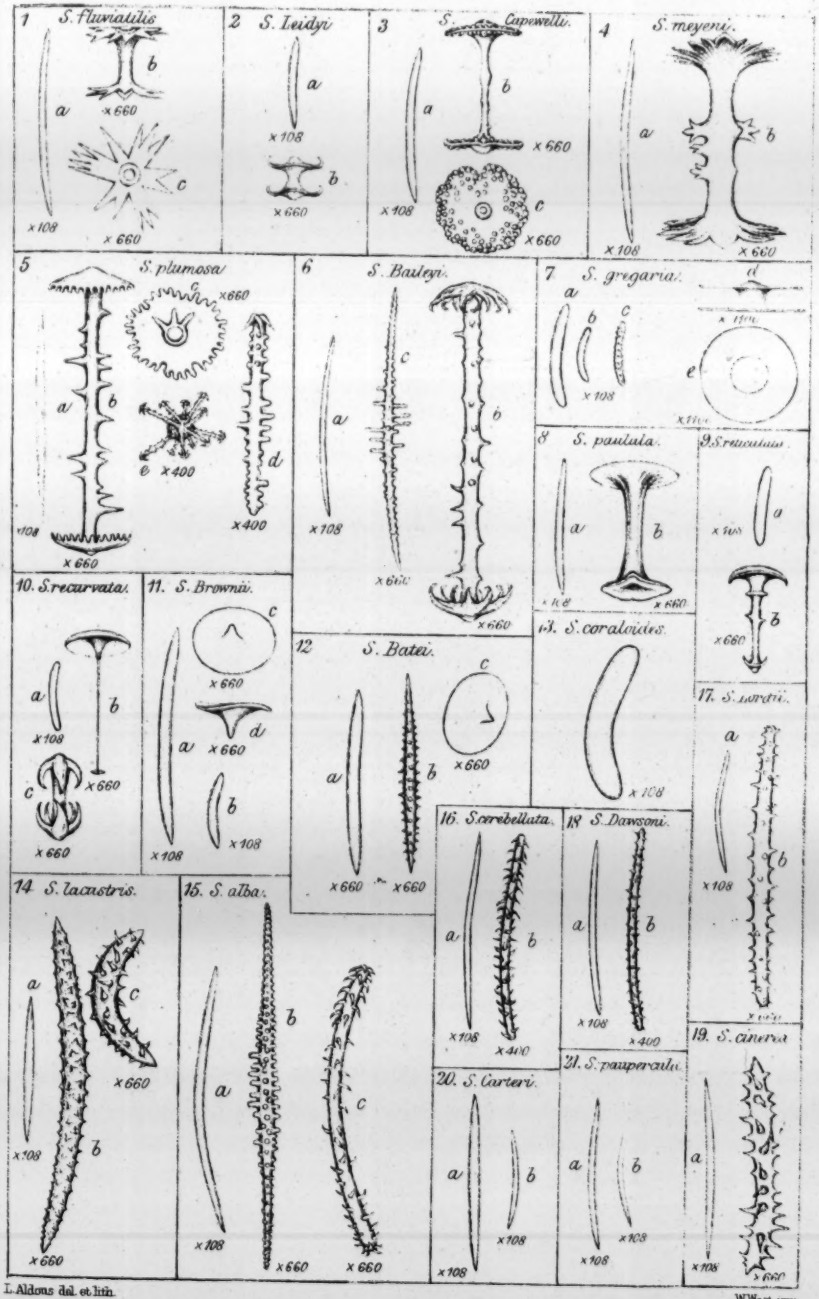
The following papers were read:—

1. A Monograph of the Spongillidæ. By J. S. Bowerbank, LL.D., F.R.S., L.S., Z.S., etc.

(Plate XXXVIII.)

Much uncertainty appears to have existed among our early writers on natural history regarding the number of our native species of *Spongilla*. Ray (Syn. Stirp. 30) notices two species under the designation of "*Spongia ramosa fluviatilis*" and "*Spongia fluviatilis ramosa fragilis*." Charles Stewart, of Edinburgh, in his 'Elements of Natural History' (vol. ii. p. 420, published in 1802), describes one species in the following terms:—"*Spongia lacustris*. Creeping on other bodies and taking their figure, brittle, with erect, round, obtuse branches. Inhabits England, Sweden, &c. This species is found in lakes and rivers; it has a strong peculiar smell; when young, flat; when old, putting forth branches. In autumn it contains little globules, like seeds, which explode when put into the flame of a candle."

Fleming, in his 'History of British Animals' (p. 524, published in 1828), describes two species under the generic designation of *Halichondria*:—"*H. fluviatilis*. Soft, brittle, and slenderly fibrous when dry; spicula linear and doubly pointed. *H. lacustris*. Hard,


1 S. fluviatilis
2 S. Leidyi
3 S. Capewellii.
4 S. meyeni.
5 S. plumosa.
6 S. Baileyi.
7 S. gregaria.
8 S. paulata.
9 S. reticulata.
10. S. recurvata.
11. S. Brownii.
12 S. Batei.
13. S. coraloides.
14 S. lacustris.
15. S. alba.
16. S. correbellata.
17. S. wardii.
18 S. Dawsoni.
19. S. cinerea.
20. S. Carteri.
21. S. pauperculo.
L. Aldous del. et lith.
W. West. imp.

Spongillæ

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brittle, and coarsely fibrous; spicula linear and doubly pointed." Dr. Johnston, in his 'History of British Sponges and Lithophytes' (published in 1842), adopts the two species established in Fleming's work, but restores them to Lamarck's genus *Spongilla*.

Dr. Fleming was perfectly right in referring the British Spongillas to the genus *Halichondria* as then constituted, as in the anatomical structure of their skeletons they do not differ in any respect from a very considerable number of British Sponges which were then included in that genus, but which I have now found it necessary to arrange separately in the genus *Isodictya*, with which genus, as far as regards the peculiarities of the structure of the skeleton, they are still identical; but they differ from it materially in their reproductive organs. In *Isodictya* the mode of reproduction is by internal gemmulation, while in *Spongilla* the same vital function is always exercised through the medium of ovaria; and in these organs a peculiar structure and class of spicula prevail, which are never found in the reproductive organs of any of the species of the marine genus *Isodictya*. Their marked difference from that genus in so important a function, and the striking and constant peculiarities of the organs appropriated to that purpose, fully warrant their being retained as a distinct genus under Lamarck's designation of *Spongilla*, in accordance with the opinions expressed by that author, as published in the second edition of his 'Histoire Naturelle des Animaux sans Vertèbres' (vol. ii. p. 111). But the description of the genus, as there given, does not appear to me to be sufficiently definite, and I have therefore endeavoured to amend it in the third part of my paper on the "Anatomy and Physiology of the *Spongiadæ*," published in the second part of the 'Philosophical Transactions of the Royal Society' for 1862, p. 1115, as follows:—

"SPONGILLA, Linnæus, Lamarck, and Johnston.

Halichondria, Fleming.

"Skeleton without fibre, composed of a symmetrical network of spicula; the primary lines of the skeleton passing from the base or centre to the surface, and the secondary lines disposed at about right angles to the primary ones. Reproductive organs ovaries, coriaceous, abundantly spiculous."

Although Dr. Johnston adopted the two British species as described by Dr. Fleming, he still retained doubts as to their being in reality more than one; and it was not until I had made careful microscopical examinations of the ovaria of each that their distinctive specific characters were determined to my own satisfaction.

If we partially dissolve these organs in hot nitric acid, we find the spicula of the walls of the ovaries of *S. fluviatilis* consisting of birotulate forms, having their axes disposed at right angles to the surface; while the spicula of the ovaries of *S. lacustris* are simple and elongate, and are disposed parallel to the surfaces of those organs, thus affording occult but certain distinctive characters, without which, from the great similarity in their habits and skeleton-structures,

it has hitherto been very difficult to distinguish one species from the other.

These peculiarities in the structure of the ovaria of the two species have a more extended value than that of merely serving to establish a specific difference, inasmuch as the subsequent examination of the different species of *Spongilla* that have come into my possession has convinced me that *S. fluviatilis* and *S. lacustris* may through their aid be considered as the types of two well-defined groups, which are distinguished by modifications of these peculiarities in the structure of each of their ovaria.

The two British Spongillas appear to have long since been found, and described under various names, in several parts of the continent of Europe; but no other species were known to naturalists until, in 1849, Mr. Carter named and described five new ones in his "Descriptive Account of Freshwater Sponges in the Island of Bombay," published in the 'Transactions of the Bombay Branch of the Royal Asiatic Society' (No. 12, 1849); and one other species I received from my friend Mr. Dean, of Clapham; it was brought by Dr. Bradley from the freshwater tanks near Aurungabad, in the dominions of the Nizam, thus making six from the East Indies. The whole of these agree, in their general habits and in the fragility and delicacy of their structure when dried, with our British species *S. fluviatilis* and *S. lacustris*. I am much indebted to Mr. Carter for his kindness and liberality in presenting me with specimens of the species he has so ably investigated and described, by which I have been enabled to compare them carefully with our European ones; and to one or the other of the two groups represented by these species the whole of the East Indian ones may be referred.

During the course of my examinations of the East Indian species, I received two consignments of Spongillas from the River Amazon, collected by Mr. Bates, the indefatigable and talented investigator of the natural history of those interesting regions. In these two collections I have been able to distinguish as many as six new species; to which may be added a seventh from the River Winguay, a tributary to the Amazon, presented to the Royal College of Surgeons by W. Bragge, Esq. The greater portion of these species differ widely in their general habits from the European and East Indian ones, being exceedingly strong and rigid in their dried condition, and the reticulations of their skeletons are very much stouter and stronger; but although thus differing, the whole of them may be referred to the group represented by our British species *S. fluviatilis*, having the ovaria furnished with birotulate or scutulate spicula.

In the seven species which I have described from the River Amazon there is an amount of variation in the forms and proportions of the birotulate spicula that renders these organs peculiarly valuable as distinctive characters. Thus, in *S. Meyeni* the birotulate forms do not differ very much from those of *S. fluviatilis*, but their proportions are three or four times as great as in that species. In *S. plumosa* the size of the rotulæ very little exceed those of *S. fluviatilis*, but the length of the spicula are at least five times that of the

British type of the group. In *S. paulula* there is a tendency in the proximal rotulæ of the spicula of the ovaries to become obsolete, few of them exceeding half the diameter of the distal rotulæ. In *S. reticulata* the proximal rotulæ are still less in their proportions; and in *S. recurvata* this part of the spiculum is represented by a slight spherical head, like that of a common pin. In *S. Brownii* and *S. Batesi* the shaft as well as the proximal end of the birotulate spiculum becomes entirely obsolete, and we have one rotula only left; the birotulate spiculum being thus represented by the scutulate forms of those species.

I have received five species from North America, including one from Vancouver's Island. The whole of these resemble, in their habits and in the fragility of their structures, the East Indian and British species. Two of them belong to the rotulate group, and three to the elongo-spiculate one. These five, I apprehend, are but a small portion of the number of species that we may expect to find in the lakes and rivers of North America.

In a letter from the late Professor Bailey, of West Point, New York, in reply to my inquiries regarding the *Spongillidæ* of America, he writes, "I have been greatly disappointed by not finding any specimens of American *Spongilla*. I felt quite sure that I had a large piece, which I gathered in Lake Monroe, Florida, having abundance of gemmules; but the most careful search among my Florida gatherings fails to bring it to light. It must have been a portion of this which I sent to Mr. Marshall; perhaps I sent him the whole, although that is not my usual custom. I send a specimen of the mud of a creek in Florida, containing spicules and *Amphidisci* from the same species as that above referred to. The Florida *Spongilla* grew abundantly on the submerged roots of the deciduous Cypress. I ought to have collected fine specimens of *Spongilla* in Maine two years ago. The river in which I looked daily, when there, abounded in *Spongilla*, which covered logs, roots, stems, &c., with masses often of several feet in extent. It generally was in a layer of from about a quarter to half an inch in thickness, of a fine *Oscillatoria*-green colour, and occasionally rising into finger-like processes of several inches in length.

"The *Spongilla* of the small lakes in this vicinity rarely forms very large masses. I have found it in layers on the undersides of stones in moderately deep water, and have also seen finger-like masses in shallow water."

In the dust from the box containing the fragments of *Spongilla* from the water-pipes of Boston, sent to me by Dr. Asa Gray, there were spicula which indicate the existence of two or three other species in the waters that supply the inhabitants of Boston. One is an acerate spiculum, as large as a full-grown one, from the skeleton of the *Spongilla* from the water-pipes, *S. paupercula*, but not smooth like that spiculum; on the contrary, it is abundantly furnished with incipient spines, which cover all parts of the shaft, excepting near the apices, where it is smooth for the space of about twice the largest diameter of the shaft. *Spongilla cinerea*, Carter, from

Bombay, has the skeleton-spicula incipiently spinous, but I have not hitherto found the same character in any of the North American species. These spinous spicula apparently represent a species at present unknown to us. Beside the spinous spiculum described above, there are two other forms, neither of which are above one-fifth or one-sixth the length of the skeleton-spiculum of *S. paupercula*; and both have every character of being tension-spicula, or those belonging to the interstitial and dermal membranes of some species of *Spongilla*. One of these is cylindrical, straight, short, and stout, with hemispherical apices, and is covered all over with incipient spines, which requires a linear power of about 300 to define them well. The other is of about the same length as the one last described, but of a fusiformi-acerate shape, is very slender, and requires a power of about 700 linear to define it well. It is entirely covered with well-produced conical spines, with a few truncated ones near the middle of the shaft. This spiculum is very like that which abounds in the dermal membrane of *Spongilla lacustris*; but it is most probable that it may be an incompletely developed one of *S. baileyi*.

In *Spongilla lacustris* the tension-spicula of the membranes and the dermal spicula of the ovaria differ in form. The former are fusiformi-acerate, covered with spines; the latter cylindrical and very much curved; so that, judging from these circumstances, it may ultimately prove that the two small forms of spicula from the dust accompanying *S. paupercula* may belong to the same sponge, or it may be that they indicate the existence of two distinct species. In the latter case, there are evidently three distinct species of *Spongilla* in the sources of the Boston water beside the one prevailing in the water-pipes.

At the time I received the specimen of *Spongilla* from Professor Bailey to which I subsequently attached his name, he very kindly sent me a small packet of infusorial earth, very rich in the spicula of the *Spongillidæ*, "from Duval's Creek, near Lake Monroe, St. John's River, Florida." I have examined this material carefully, with the view of forming an approximate estimate of the number of species of *Spongilla* existing in the waters whence it came; and the following are the results. I found the birotulate spicula of the ovaria of *S. Baileyi* in moderate abundance, but I did not recognize those of the membranes. A second form of birotulate spiculum, with a strongly spiculated shaft, occurred in abundance. This spiculum is very like those of the ovaries of *S. Meyeni*, Carter, from the water-tanks of Bombay, and could not by its form alone be separated from those of that species. Beside these there are a considerable variety in size and form of smooth spicula, which have every appearance of being skeleton-ones; so that the number and variety of these justify the idea, eliminated by the number and variety of tension-spicula of unknown species, that there are at least five or six North American species of *Spongilla* beside those with which I am already acquainted.

The Australian species *S. Capewelli* is an interesting addition to

our knowledge, and indicates a very extensive range for the genus. And not the least remarkable point in its history is its very close approximation in habit and structure to our British species *S. fluviatilis*. During my examination of the Australian specimen, I met with two spicula of the same form, entirely spined, cylindrical, which do not belong to *S. Capewelli*, and which are probably tension-spicula, or spicula of the ovaria, of a second species existing in Lake Hindmarsh.

SPONGILLA FLUVIATILIS, Johnston.

Sponge massive, sessile; surface uneven, often lobular, hispid. Oscula simple, large, scattered. Pores conspicuous. Dermal membrane pellucid, aspiculous. Skeleton-spicula acerate. Ovaria subglobose; spicula birotulate, short, rarely spinous; disposed in lines radiating from the centre of the ovarium; rotulæ equal in size, flat, deeply and irregularly dentate, diameter equal to the length of the shaft of the spiculum.

Colour, alive, yellow or green.

Hab. Rivers and lakes of Europe.

Examined alive.

Dr. Johnston, in his 'History of British Sponges,' has given so able a digest of all that has been written regarding this species and its numerous changes of name, both generic and specific, as to render any observations on that part of my subject a work of supererogation.

The normal form of this species is certainly massive and sessile; and the arborescent form that it is said to occasionally assume is due to its having originally been parasitical on stems of plants, and perhaps also not unfrequently to *S. lacustris* having been mistaken for this species. When developed under favourable circumstances, I have seen large rounded lobes projected from its surface; but I have never seen it assume an arborescent form like that of *S. lacustris*.

The absence of spicula in the dermal membrane of this species readily distinguishes it from *S. lacustris*; but the most striking differential character exists in the birotulate spicula of the ovaria, the correct form and position of which were, I believe, first pointed out by Meyen in Valentin's 'Repertorium,' 1840.

The shaft of the spiculum is usually smallest at the middle, and it increases more or less as it approaches the rotulæ; and occasionally, but rarely, we find a single large spine projecting at right angles from near its middle. The rotulæ are flat and deeply and irregularly divided, the divisions frequently extending from the circumference to very near the centre. They are disposed very closely together in the walls of the ovaria, the outer rotula supporting the external membrane, and the inner one performing the same office for the internal membrane; but they are so completely covered by the respective membranes, that without the application of nitric acid they would be extremely likely to escape observation.

SPONGILLA LEIDII, Bowerbank.

Sponge sessile, coating thin; surface tuberculated, minutely hispid.

Oscula numerous, small, congregated, elevated, and marginated. Pores conspicuous. Skeleton-spicula acerate, small, short, and stout, rather obtusely terminated. Dermal and interstitial membranes pellucid, aspiculous. Ovaria spherical, small; dermal spicula birotulate, minute, short; shaft cylindrical; rotulæ, margins entire, that of the outer one sometimes exflected, and rarely spiculated.

Colour yellow, with a tint of green.

Hab. Schuylkill River, United States (*Dr. J. Leidy*).

Examined in the dried state.

I am indebted to my friend Prof. Leidy of Philadelphia for a specimen of this species, $3\frac{1}{2}$ inches long, $2\frac{3}{4}$ inches wide, and $\frac{1}{5}$th of an inch in thickness. The whole of the upper surface is thickly and rather uniformly studded with variously shaped elevations, none of which exceed about a line in height; and each one has on its summit one or more oscula, and frequently as many as five or six, the whole being enclosed within a slightly raised, thin margin. The oscula are exceedingly numerous, but very minute. The pores are readily to be distinguished by the aid of a lens of 2 inches focus. The whole surface of the sponge is minutely hispid from the projection of the terminal spicula of the primary lines of the skeleton-tissue.

The spicula of the skeleton are short and stout; an average-sized one measured $\frac{1}{150}$ inch in length, and had a diameter of $\frac{1}{2000}$ inch. I could not detect any tension-spicula in either the dermal or interstitial membranes.

The ovaria are rather abundant at the basal surface of the sponge; they are very small, and are scarcely visible to the unassisted eye. In the dried state they are nearly all of them more or less hemispherical by contraction, but their normal form is spherical. In the adult state they are furnished with a closely packed stratum of birotulate spicula. They are very minute, an adult one measuring $\frac{1}{214}$ inch in length, the diameter of the rotulæ being $\frac{1}{1500}$ inch, and the diameter of the shaft $\frac{1}{7500}$ inch. They are not visible, excepting by previous preparation in boiling nitric acid. The margins of the rotulæ are very entire, and in fully developed spicula that of the outer one is frequently exflected; but I did not observe this character to occur in any of the proximal ones. In a very few instances the shaft of the spiculum was continued through the centre of the distal rotula, forming an acutely terminated central spike.

When a section at right angles to the dermal surface of the sponge was examined, two distinct layers of growth were visible, the first dermal membrane remaining in the midst of the sponge. From this circumstance it appears probable that the species is perennial, and, from the last stratum being in perfect accordance with the first, that its natural character is that of a thin coating sponge, never rising in the form of tuberous masses like the closely allied European species, *S. fluviatilis*.

The specific names *friabilis* and *fragilis* have been applied so loosely and indefinitely to the European species that I do not think it advisable to adopt the latter, which was appended to the specimen

sent to me; and as I am not aware that the species has been described and published before, I beg to dedicate it to my friend Dr. J. Leidy, who has worked so well and worthily for the advancement of science, and to whom I am indebted for my knowledge of the species.

SPONGILLA CAPEWELLI, Bowerbank.

Sponge massive, sessile; surface uneven, often lobular, smooth. Oscula simple, minute, dispersed. Pores inconspicuous. Dermal membrane pellucid, aspiculous. Skeleton-spicula acerate, rather short and stout. Ovaria subglobose; spicula birotulate, rather long, disposed in lines radiating from the centre of the ovary; rotulæ flat, margins slightly and irregularly crenulate; shafts slender, incipiently spinous, varying in length from one to one and half diameter of a rotula.

Colour dull green, with a tint of yellow.

Hab. Lake Hindmarsh, Victoria, Australia; lat. 35° 30′ S., long. 141° 40′ E. (*L. P. Capewell, Esq.*).

Examined in the dried state.

We are indebted to the energy and enterprise of Mr. Capewell for the knowledge of the existence of *Spongilla* in the freshwater lakes of Australia. The specimen, the type of the above description, is $7\frac{1}{2}$ inches long and 3 inches in its greatest diameter, surrounding in a very irregular manner a small twig of wood, not $\frac{1}{4}$ of an inch in diameter, and from which it projects in large tuberiform masses. Mr. Capewell states in his letter to me that "the manner in which it is found is, lying upon the shores. In the winter season, about June, the weather being very tempestuous, the lake becomes greatly agitated, and the roll and swell is so great that at times a small boat could scarcely live upon the surface. It is after one of these storms that, by searching along the shores, you may obtain specimens. I have searched well for it among the reeds and upon the branches of trees pendant in the water, but did not succeed in finding them in those situations, and my impression has always been that it coated dead branches of trees that have fallen some depth in the water.

"The colour and appearance of the specimens when found is exactly the same as the dried specimen would have if dipped in water."

The description of the habit of this *Spongilla* would do equally well for that of our British species *S. fluviatilis*, with which it assimilates in anatomical structure in a very remarkable manner.

The oscula appear to be less in size, but more numerous, than in the British species, and the skeleton less fragile. The skeleton-spicula are shorter and stouter than those of *S. fluviatilis*, their length being in comparison about as 3 to 4. The ovaria are numerous; they are situated on the basal membrane in a single, closely packed stratum, and do not appear dispersed in the substance of the deeply seated portions of the sponge as in *S. fluviatilis*. In their size and general appearance they very closely resemble those of the British species. Externally they are supplied with numerous short, curved,

acerate spicula, which are irregularly dispersed on their surfaces. The birotulate spicula of the ovaria, compared with those of *S. fluviatilis*, present the most decided differential characters. The rotulæ, instead of being deeply incised at their margins, are only slightly crenulate; and their shafts, although longer in proportion than those of the British species, are scarcely half their diameter, and nearly all of them are incipiently spinous. Thus, notwithstanding their general similarity in form, these differences in structure at once establish the distinct specific character of this sponge.

SPONGILLA MEYENI, Carter.

Sponge massive, sessile; surface tuberculous, hispid. Oscula scattered, mostly intertuberculous. Pores conspicuous. Dermal membrane aspiculous, thin, and translucent. Skeleton-spicula acerate, stout, incipiently spinous. Ovaria subglobular; spicula birotulate, disposed in lines radiating from the centre of the gemmule; rotulæ flat, irregularly but deeply dentate, divisions frequently extending to near the axis; shaft from once to twice the length of the diameter of the rotulæ, cylindrical, without spines or with from one to three or four near its middle.

Colour yellow.

Hab. Freshwater tanks, Bombay (*Carter*).

Examined in the dried state.

I have received four specimens of this species from Mr. Carter. The surface of all of them is profusely furnished with large tuberculous projections; on two of them these masses are rounded evenly, and terminate nearly hemispherically; while in the other two they are more attenuated, furrowed longitudinally, and are rather sharply terminated. These varieties of form are evidently the effect of differences in locality only, as in all their organic characters they are in perfect accordance.

There is a remarkable coincidence in the organic characters of this species and our European *S. fluviatilis*. The indistinct mode of the arrangement of the skeleton, the form of the spicula of which it is composed, the form of the ovaria and of their spicula are as nearly as possible the same; and it is only when we examine not only the forms but the proportions of these organs, that we perceive that there are really sufficient organic differences to constitute them distinct species.

The variation in the spicula of the skeleton is not very great, those of *S. Meyeni* being $\frac{1}{61}$ inch in length, while those of *S. fluviatilis* are but $\frac{1}{45}$ inch long. In the characteristic spicula of the ovaries it is that the greatest discrepancy exists. In *S. fluviatilis* they are remarkably constant in their proportions, being $\frac{1}{124}$ inch in length; and the rotulæ are as near as possible equal in diameter to the length of the spiculum: the rule is, that the shaft should be without spines; and the occurrence of a single spine near its centre is the exception, and this occurs in about the proportion of one to twenty or thirty smooth spines; while, on the contrary, in *S. Meyeni* the rule is the presence of from one to four or five spines on the shaft, and the ex-

ception their absence, one in every three or four being without them; and the size of the spicula is exceedingly variable, ranging from $\frac{1}{843}$ inch long and broad to $\frac{1}{500}$ inch long by $\frac{1}{1000}$ inch broad. In other respects the spicula in both species are remarkably similar in their characters. If we have recourse to the less constant but (in this case) valuable characters of form and colour, we can scarcely mistake the species, as the dissimilarity in those respects are strikingly marked.

The measurements given by Mr. Carter of those organs, in his valuable paper, are as nearly in accordance with those I have made as they can be expected to be in such a case.

I have been unable to find any "amorphous siliceous deposit" cementing the spicula of the gemmules together, and a few minutes' boiling in nitric acid effects a complete separation of them from the animal tissues in which they are imbedded.

I do not think it probable that the species examined by Meyen was the one that has been named after him, but rather that it was our European species *Spongilla fluviatilis*, with the structure of which Mr. Carter (from his residence in India at the time of writing his paper) was not acquainted.

SPONGILLA PLUMOSA, Carter.

Sponge sessile, massive or subramose; surface hispid. Oscula dispersed, numerous. Pores inconspicuous. Dermal and interstitial membranes aspiculous. Skeleton-spicula fusiformi-acerate, stout. Ovaries semiovoid; spicula birotulate, disposed in lines radiating from the centre of the ovary; shaft three to four diameters of the rotulæ in length, cylindrical, abundantly spinous; rotulæ externally convex, internally concave, margins irregularly dentate. Sarcode: spicula subsphero-stellate, multiradiate; radii spinous; apices pileate or capitulate.

Colour yellow or green.

Hab. Freshwater tanks, Bombay (*Carter*).

Examined in the dried state.

I have received three specimens from Mr. Carter of this distinct and well-characterized species: two of them are portions of larger Sponges, they are both yellow and massive, having the upper surface of each with very slightly elevated portions, but exhibiting no ramose projections; while the third specimen, rather exceeding 4 inches in diameter, is entirely composed of short branches of a bright-green colour, ramifying from a common base. It is therefore apparent that there is a considerable latitude in form and colour in this species; and in truth the difference in these respects is so great between the last and the first two specimens that a superficial examiner would undoubtedly designate them as distinct species; while in their organic structures there is no perceptible difference.

An average-sized spiculum of the skeleton measured $\frac{1}{64}$ inch long and $\frac{1}{136}$ inch greatest diameter.

The greater portion of the ovaries are semiovoid in form; a few

of them are subglobose; but the most striking specific character exists in the birotulate spicula of these organs, which vary remarkably in form and proportion from those of any known Indian species of *Spongilla*. While those of *S. Meyeni* rarely exceed two diameters of the rotulæ in length, in *S. plumosa* they nearly all range from three to three and a half diameters long. The shaft is equably cylindrical throughout its whole length, and is abundantly furnished with stout spines, frequently exceeding the diameter of the shaft in length. The rotulæ also are essentially different from those of either *S. fluviatilis* or *S. Meyeni*: in those species they are thin, flat on both sides, and irregularly and deeply dentate, the divisions reaching very nearly to the centre of the rotulæ; while in this species the rotulæ are internally concave and considerably and regularly convex on the outer surface, having the circumference only slightly dentate in comparison with the species above named, and, whether *in situ* after preparation in nitric acid, or in a state of separation, they are perhaps the most beautiful form of sponge-spiculum with which we are acquainted.

The occurrence of subsphero-stellate spicula in the sarcode of this species is a remarkable fact, as they have not hitherto been found in any species of the genus; nor are they frequently found among the marine *Spongiadæ*. They occur in the sarcode of *Tethea lyncurium*, but the radii are acutely terminated and are without spines. In *Pachymatisma Johnstonia* they abound in the sarcode, with very short incipient spines on the radii; and in *Geodia carinata*, from the South Pacific Ocean, Bowerbank MS., I obtained one spiculum in which the rays are profusely spined. In *Dactylocalyx pumicea*, Stutchbury, multiradiate spicula are found, the radii of which have either acute or depressed capitulate terminations, but without spines; and it is only from *Spongilla plumosa* that I have observed them to have pileate or capitulate terminations and have the radii at the same time strongly spined. The subsphero-stellate spicula are exceedingly variable in the mode of their development: sometimes there is one comparatively large straight fusiform spiculum, pileate at one or both ends, and one or more slightly developed rays dispersed near the middle of it, also more or less pileated; but the general form is a series of rays of nearly equal length radiating from an irregularly formed common centre, having a few recurved spines on the shaft, and a closely packed cluster of recurved spines at the apex, which take the shape of a little cap closely resembling a young mushroom in form; but when not fully developed, they assume the appearance of an irregular capitulum. Occasionally, but not very frequently, they terminate acutely. The extreme diameter of a well-developed cluster of radii is about $\frac{1}{800}$ inch.

These beautiful spicula are not mentioned in the specific description of this Sponge by Mr. Carter; but he subsequently observed them and mentioned them in a letter to me in the latter part of 1854.

That author in his paper observes, "I have only found three or four specimens of it (*S. plumosa*), and these only in two tanks. I have never seen it fixed on any body, but always floating on the sur-

face of the water about a month after the first heavy rains of the S.W. monsoon have fallen."

SPONGILLA BAILEYI, Bowerbank.

Sponge coating; surface smooth? Oscula and pores inconspicuous. Dermal membrane spiculous; spicula fusiformi-acerate, entirely spined; spines of the middle cylindrical, truncated, very long and large. Skeleton-spicula subfusiformi-acerate, rather slender. Interstitial membranes spiculous; spicula same as those of the dermal membrane. Ovaria globular, smooth, abundantly spiculous; spicula arranged in lines radiating from the centre to the circumference of the ovary, birotulate; rotulæ irregularly and deeply cleft at the margins, incurvate; shaft very long, cylindrical, entirely spined; spines conical.

Colour, in the dried state, dark green.

Hab. A stream on Canterbury Road, West Point, New York (*Prof. J. W. Bailey*).

Examined in the dried state.

I am indebted to the late Prof. Bailey, of West Point, New York, for my knowledge of this interesting species. In a letter to me, dated 30th Nov. 1856, he writes, "The only bit of *Spongilla* I have been able to find in my collection is from a small mountain-stream near West Point. It was picked from a small pebble in a pool which the stream formed as it crossed the road. It attracted my attention, I believe, as being of very small size to have gemmules. I send it just as it was gathered."

The specimen was in an oblong packet less than an inch in length; it contained a few fragments of *Spongilla*, the largest of which was about two lines in diameter. It was full of gemmules, and in fine condition for examination.

The structural peculiarities of this Sponge are very remarkable; it belongs to the tribe of which all have birotulate spicula imbedded in the coat of the ovarium and disposed in lines radiating from the centre to its circumference. It has the birotulate spicula four or five times as long in their proportions as those of the ovaria of *S. fluviatilis*. Its nearest congener is the East Indian species *Spongilla plumosa*, Carter; but it differs in structure from that Sponge, both as regards the tension-spicula and those of the ovaria, the rotulæ in *Spongilla Baileyi* being cleft or dentated to very near the centre, while those of *S. plumosa* are entire, excepting a slight marginal crenation, and the shaft also is considerably shorter than in those of *S. baileyi* when fully developed.

I observed these beautiful spicula in every stage of development, from the slender smooth shaft with only slightly clubbed terminations to the abundantly spinous shaft and fully produced rotulæ, just as those of *S. plumosa* are represented in pl. 26. figs. 18–20, in the 'Phil. Trans.' of the Royal Society of London for 1858.

The tension-spicula of the dermal and interstitial membranes are remarkably characteristic. They are very small, and require a power of about 700 linear to define them well. They are very similar to

the corresponding spicula in *Spongilla alba*, Carter, from the water-tanks of Bombay; but the truncated cylindrical spines are longer than in that species. In *S. Baileyi*, near the middle of the spiculum, they often equal and sometimes exceed in length its greatest diameter. Fig. 22, pl. 24, 'Phil. Trans. London' as above quoted, serves well to represent the general character of these spicula.

I have much pleasure in dedicating this interesting species to the memory of one who has done so much, and in so able a manner, to develope the microscopical natural history of his country, and who was ever ready to assist his brother naturalists in any quarter of the globe, either with material for examination or with information from his rich stores of knowledge.

SPONGILLA GREGARIA, Bowerbank.

Skeleton-spicula cylindrical, stout, and rather short. Ovaria furnished with an envelope; spicula of the envelope few and scattered, cylindrical, short and stout, entirely spined. Ovaria, surface even, furnished abundantly with very short birotulate spicula; rotulæ flat, margins entire, outer surface umbonate; umbo very short, slightly convex. Shaft of spiculum cylindrical, short, and stout.

Colour, dried state, dark lurid green.

Hab. River Amazon, on branches of trees periodically pendent in the water, near Villa Nova.

Examined in the dried state.

All that I have yet seen of this species consists of small patches of ovaria, varying from $\frac{1}{8}$th to $\frac{3}{16}$ths of an inch in diameter, of a single layer of ovaries partially surrounding the small branches of trees pendent in the water of the River Amazon at certain seasons of the year. These little patches of ovaria look very like groups of the eggs of flies the larvæ of which are aquatic, and which are so frequently to be seen on the small stems and branches at the margin of ponds and rivers. On examining them with a Lieberkuhn, and power of one hundred linear, it was at once apparent that they were not ovaria of the *Spongilla* that occupied the greater part of the stem on which they were seated—*S. reticulata*. I therefore proceeded to a regular examination of them, and soon satisfied myself that they belonged to an entirely new species, with the mass of the Sponge of which I am still unacquainted; but from the well-marked characters to be derived from their structure and the small portion of the skeleton connecting them together, I have been enabled to give a provisional description that will serve to give a standing to the species until a better acquaintance with the entire Sponge allows us to complete the characters.

The spicula of the skeleton are cylindrical and smooth, and very little larger than those of the envelope of the ovaries. They vary somewhat in size, and occasionally the rudiment of a spine or two may be detected upon them; but this may perhaps be induced by their being so closely connected with the envelope of the gemmule, and occurring only in the short cylindrical portions of skeleton connecting the gemmules together; and I am the more inclined to this

opinion as I observed a few of the profusely spiniferous spicula of the envelope intermixed with the proper smooth spicula in the short lengths of skeleton separating the ovaria. The spicula of the envelope of the ovary are also cylindrical in form; but they are rather shorter and stouter in their proportions than those of the skeleton, and occasionally evince a slight inclination to be subfusiform, and they vary considerably in size. They are slightly curved, and abundantly spiniferous, more especially on the outer curved surface and towards the middle of the shaft of the spiculum. They are dispersed very irregularly over the envelope; and many of them are nearly completely immersed in its strong, coriaceous, cream-coloured substance; but none of them are visible on its inner surface, which appeared quite smooth. The wall of the ovary is much thinner than that of the envelope, and is apparently very little thicker than the length of the short birotulate spicula, which are closely packed in a single layer in all parts of its substance. The spicula of the wall of the ovary are very beautiful objects. The rotulæ consist of two thin flat plates of equal size, with entire margins, connected by a very short, thick, smooth, cylindrical shaft, a slight protrusion of each end of which through the centre of each rotula forms a very short convex umbo on the centre of each outer surface. They are very small; an average-sized one measured, length of spiculum $\frac{1}{3000}$ inch, diameter of rotula $\frac{1}{1538}$ inch, length of the shaft within the rotula $\frac{1}{8888}$ inch.

The gregarious habit of these curious ovaries is very interesting, and the manner in which they are based on the surface of the bark of the plant is very suggestive of the habit. They are not closely adherent by the surface of the envelope, but are supported by a single series of skeleton-spicula, disposed at various angles like a crowd of small props, one end of each spiculum being based on the epidermis of the plant, while the other impinges on the surface of the envelope, the whole being strongly bound together by the horny structure of the skeleton; and short lengths of skeleton-fibre are thrown out laterally, by which the ovaria are connected with each other. It would therefore appear that, as soon as the locality has been selected, the adherent envelope of each ovary generates a single series of spicula to support it above the surface of the plant, so as to allow of a free circulation of water around it during the period of its immersion, and that afterwards they remain dormant in this condition until the next season of immersion in the water, as all these little groups were in precisely the same stage of development; and they were by no means few in number. On one small twig which passed through a specimen of *S. reticulata* 5 inches in length, and extended 4 inches beyond its termination, there were no less than six of these small colonies, varying from three to twenty-six in number, although the branch did not exceed one-eighth of an inch in diameter at any part.

SPONGILLA PAULULA, Bowerbank.

Sponge sessile, coating surface rugged, spinous. Oscula simple,

minute, dispersed. Pores inconspicuous. Dermal membrane obsolete. Skeleton-spicula subfusiformi-acerate. Ovaria globose; surface even, slightly pitted; enveloping spicula few, scattered, fusiformi-acerate, entirely spined; spines minute, conical; spicula of the walls inequi-birotulate; rotulæ radially lineated, margins entire, shaft cylindrical.

Colour, dried state, light brown.

Hab. River Amazon, on leaves or branches of trees, occasionally pendent in the water. Near Villa Nova.

Examined in the dried state.

This singularly insignificant little species, as it appears from the only specimen I have yet seen, forms a light-brown incrustation, about three-fourths of an inch long, a quarter of an inch wide, and not exceeding half a line in thickness, on a small leaf from one of the stems on which a *Spongilla reticulata* from the River Amazon was seated. It is firmly attached to the leaf by a comparatively stout pellucid basal membrane. It is very irregular and rugged in its structure, throwing up from its base short, stout, conical masses of spicula terminating acutely and giving a strongly spinous and uneven appearance to the distal surface. I examined the Sponge through this surface, both as an opake and a transparent object, with a power of 160 linear, in search of ovaria, but in vain; but on reversing one of the fragments removed from the leaf, I succeeded in detecting a few very minute immature ovaries closely seated on the inner surface of the basal membrane, and completely buried beneath the reticulations of the skeleton. On examining these by nitric acid, I found that none of the spicula of the walls of the ovarium that might be expected to be present were developed; but a renewed investigation of the whole of the fragments I possessed produced one adult ovary, $\frac{1}{60}$ of an inch in diameter, which I succeeded in isolating and preparing successfully for observation. On immersion in water, and when fully expanded, it appeared of a light cream-colour, with an even but slightly pitted surface, to which a few fusiformi-acerate spicula, very much less than those of the skeleton, and very variable in size, were adherent. After careful preparation of the gemmule in nitric acid, these spicula were found to be entirely spined, but the spines are so minute as to require a power of 660 linear to exhibit them in a satisfactory manner. An average-sized spiculum of this description measured, length $\frac{1}{300}$ inch, greatest diameter $\frac{1}{5\,2\,8}$ inch. The walls of the ovary were filled with stout inequi-birotulate spicula $\frac{1}{7\,8\,7}$ inch in length; the larger rotula measured $\frac{1}{1\,0\,8\,2}$ inch in diameter, and the smaller one $\frac{1}{1\,5\,9\,8}$ inch in diameter. The shaft is cylindrical, expanding slightly towards each end; the diameter at the middle was $\frac{1}{8\,0\,0\,0}$ inch. The central canal in the shaft is unusually and strikingly visible; and at its terminations in the rotulæ it throws off numerous minute radiating branches, extending from the centre to the circumference of those parts of the spiculum, giving to them, when viewed with a linear power of 660, a radially lineated appearance. In one of the large rotulæ I counted nineteen of these minute canals.

An average-sized spiculum of the skeleton measured, length $\frac{1}{100}$ inch, greatest diameter $\frac{1}{1639}$ inch.

SPONGILLA RETICULATA, Bowerbank.

Sponge massive, sessile; surface spiniferous, interspaces closed by a coarse reticulation of spicula. Oscula, pores, and dermal membrane obsolete. Skeleton-spicula subfusiformi-cylindrical, short, and stout. Ovaria spiculous, encased in an oval, irregular, and coarse reticulate envelope of spicula; surface of envelope even. Spicula of envelope cylindrical, slightly curved, entirely spined, short, and stout. Ovaria oviform, thin; surface smooth; foramen tubular: spicula boletiform; large internal extremity, externally convex, internally concave, margin entire; small external extremity, clavate, sometimes stellate; shaft more or less attenuating from each end towards the middle, furnished irregularly with a few conical spines.

Colour, dry state, dark green, with a brown tint.

Hab. River Amazon, on pendent branches of trees.

Examined in the dried state.

I received nine fine specimens of this interesting species from Mr. Bates. The label accompanying them states that they were from "Dark Ygapos in virgin forest, margins of Amazon, Villa Nova (when the waters have receded, found clinging to the trees), Nov. 20, 1854." The largest specimen surrounds a curved branch of a quarter of an inch thick. The Sponge is fusiform, 9 inches in length, and 2 inches at the greatest diameter in thickness; the surface is irregularly tubercular. The other specimens vary considerably in form, following the direction of the branches, which they surround completely, although frequently not more than the eighth of an inch in thickness; and of the very young specimens, four of which occur on different branches of the same stem, one, although not more than half an inch long, has already succeeded in entirely embracing the stem.

The superficial interspaces are closed by a coarse rigid network of spicula. Through this the terminations of the primary fibres of the skeleton are projected a line or more in length, forming stout conical spines all over the surface. The internal interspaces are also more or less filled with a similar network to that which closes the superficial ones.

The spicula of the skeleton are short, stout, and cylindrical, with a slight inclination to be fusiform, especially when large and fully developed; the terminations are hemispherical.

The ovaria are abundant in all parts of the Sponge. The envelope is composed of a coarse, irregular network of spicula, the interstices being filled in by membranes thickly coated with sarcode. The spicula are cylindrical, with hemispherical terminations, and they are furnished in all parts with short conical spines. The envelope is sometimes observed attached, by one side, to a large fibre; at other times it is supported in an interspace by two or three short pedicels of spicula. The ovarium fills the interior of the envelope; it is ovi-

form, terminating at the small end in a short, cylindrical, tubular foramen, the length of the tube beyond the outer surface of the ovarium being about equal to its diameter. The foramen appears to be most frequently at the distal end of the envelope as regards its attachment to the skeleton. The thickness of the wall of the ovarium appears to be determined by the length of the boletiform spicula, the outer convex surface of which forms the inner surface of the ovary, while the small clavate or stellate end is seen either immediately beneath the outer surface of the ovary or slightly projecting beyond it. In the living condition it is probable the former would be its natural position.

There are several singular points in the structure of this species. I have never found before among the *Spongillidæ* either the ovary oval or the foramen distinctly projected above its surface; and it is the first occurrence of the singular and beautiful boletiform spicula.

SPONGILLA RECURVATA, Bowerbank.

Sponge sessile, coating surface even, smooth. Oscula inconspicuous, numerous, simple, dispersed. Pores inconspicuous. Dermal membrane thin, translucent, aspiculous. Skeleton-spicula cylindrical, short, and stout. Ovaries globose; surface even, pitted, furnished with spicula: external spicula multihamate-birotulate; hami of the rotulæ stout, attenuating, much recurved; shaft cylindrical: internal spicula boletiform; proximal or large extremity irregularly circular, flat, or very slightly convex outwardly, thin, margin entire; small or distal extremity lentiform; shaft attenuating from the larger to the smaller extremity.

Colour, dried state, light brown.

Hab. Villa Nova, River Amazon.

Examined in the dried state.

This little species was found closely embracing about half of one of the small stems of a tree, which a full-sized specimen of *Spongilla reticulata* covered for about 6 inches in length; the stem rather exceeded one-eighth of an inch in diameter; and the large Sponge in its growth has evidently partially grown over the smaller one, which is not more than one-third of a line in thickness. The best specimen I possess was detached, and was found loose in the paper in which the whole of the specimens I received from Mr. Bates were packed; it is about three-fourths of an inch in length; and the Sponge when whole, judging from the length of the detached portions, may have been about 3 inches in length. In the largest detached piece there were more than forty ovaria imbedded in one stratum at the base of the Sponge, with the foramen of the greater part of them downwards. The diameter of an average-sized one was $\frac{1}{40}$ inch. We may therefore fairly infer, although the Sponge is so thin, that it is in an adult condition. Notwithstanding its length, it does not appear to be in the habit of entirely surrounding the stem on which it is seated, as it had done so in one small spot only.

The oscula are not visible without the aid of a lens; they are various in size, and rather numerous. The dermal membrane is thin and

translucent, and is supported on a network of spicula; this network of the dermal surface is thick and abounding with spicula; but that of the internal skeleton seldom exceeds two or three spicula in substance, and the size of the interstices are usually determined by the length of the spicula, which vary considerably in size. A fully developed one measured, length $\frac{1}{176}$ inch, greatest diameter $\frac{1}{1579}$ inch.

In the dried condition the ovaries are nearly hemispherical, but when expanded in water they become globose; in this state, when viewed with a power of one hundred linear by the aid of a Lieberkuhn, they are cream-coloured, and present an irregular and deeply pitted surface; and from these indents or pits the multiradiate-birotulate spicula of the outer surface of the ovary are projected at right angles to the surface, very often for nearly the whole of their length. If the ovaries be acted on by boiling nitric acid so as to render it transparent without entirely disintegrating it, we then see the delicate and beautiful boletiform spicula, the large rotulæ of which are placed at the inner surface of the ovarium; while the slender shaft with its small lentiform distal termination is projected, at right angles to the inner surface, through the substance of the wall of the ovary to very nearly its outer surface. This spiculum certainly presents one of the most graceful and elegant forms I have ever seen among sponge-spicula.

The external surfaces of the rotulæ of the birotulate spicula are smooth, very convex, and in many cases almost hemispherical; so that the points of the curved spines are in the direction of planes parallel to the shaft of the spiculum, and the rotula is cleft almost to the point of union with the shaft. The number of spines vary: in one rotula there were as many as ten; but the usual number is about five or six.

The contrast between the two sorts of spicula in the ovary is very great; one is all lightness and delicacy of structure, the other the type of strength and solidity. The latter, the multiradiate-birotulate form, is $\frac{1}{1056}$ inch in length, the diameter of the rotulæ $\frac{1}{1500}$ inch, and the diameter of the shaft $\frac{1}{4258}$ inch. The former or boletiform spicula have the following dimensions:—length $\frac{1}{707}$ inch, diameter of large discal end $\frac{1}{1027}$ inch, and diameter of the middle of the shaft of the spiculum $\frac{1}{25000}$ inch. Lentiform termination $\frac{1}{8000}$ in diameter.

Spongilla Brownii, Bowerbank.

Sponge massive, sessile; surface spiniferous; superficial interspaces open. Oscula, pores, and dermal membrane obsolete. Skeleton-spicula fusiformi-acerate, very stout. Ovaries spherical, spiculous, encased in a globose, irregularly but closely reticulate envelope of spicula; surface of envelope even; spicula of envelope acerate, short, and stout, slightly curved. Ovary-surface tuberculate; tubercles long and narrow; spicula of the ovary umbonato-scutulate, minute.

Colour, dried state, pallid green.

Hab. River Amazon, on branches of trees pendent in the water (*Mr. R. Brown*).

Examined in the dried state.

I am indebted to Mr. Robert Brown for my knowledge of this interesting species, which he informed me he believed was collected from the River Amazon; and from the similarity of its structure to other species of *Spongilla* which I have received from Mr. Bates, who collected them from that river, I am induced to believe the locality is correct.

The specimen is considerably mutilated, so that the natural size and form cannot be determined with precision; in its condition when I first saw it in Mr. Brown's possession, it was about 3 inches in length by $1\frac{1}{2}$ inch in breadth and thickness. The stem of wood to which the Sponge is fixed, and which passes in a diagonal direction through the portion which was kindly given to me by Mr. Brown, does not much exceed a line in diameter; and the attachment is by an open network of flattened fibre, which embraces it closely in all parts.

The primary fibres of the Sponge are stout and nearly parallel to each other, and do not, as is usually the case, radiate from the stem of wood at right angles to its long axis. The secondary fibres uniting the primary ones are irregular in their direction. The surface is strongly spiniferous from the projection of the terminations of the primary fibres, and the spaces between the spinous terminations are open and entirely destitute of either membrane or reticular structure. The skeleton-spicula are $\frac{1}{60}$ inch in length, and their greatest diameter is $\frac{1}{666}$ inch.

The ovaries are situated immediately beneath and for a short distance within the outer surface of the Sponge, and none were observed more deeply seated. The attachment of the ovary-case or envelope is not by an especial pedicel or a single point; occasionally it has two or three points of adhesion to the same fibre by short pedicels, and it is often thus attached to two or more separate fibres, or it has one broad sessile attachment to a single fibre. The surface of the envelope is even, and there is no foramen on it, nor any indication of the position of that of the ovary within it. The ovary is closely embraced by the strong spicular envelope, and small elongate masses of its outer surface are projected, here and there, through the interstices of the envelope, causing the latter to be more or less tuberculous; and from the smallness of the interstices the tubercles are much greater in length than in thickness; while in the nearly allied species, *S. Batesii*, the tubercles of the ovarium-case are much thicker than they are high, and the spicula of the envelope are nearly twice as long as those of *S. Brownii*. The spicula of the envelope are more regularly acerate than those of the skeleton: they vary somewhat in size and degree of curvature; the dimensions of two that I measured were $\frac{1}{125}$ inch long by $\frac{1}{1224}$ inch diameter, and $\frac{1}{158}$ inch long by $\frac{1}{1364}$ inch diameter. They are disposed in a close but irregular network, seldom exceeding two spicula in thickness.

The scutulate spicula of the ovary are seated on the outer surface of the inner membrane of that organ, with the umbo of the scutulum outward; but in their natural condition they do not appear to

penetrate the outer membrane; and until the ovary has been rendered transparent by the aid of boiling for a few seconds in nitric acid, they are completely immersed in the tissues. They are disposed in a single layer, but are so closely packed together that their margins frequently overlap to a considerable extent. The form of the scutulum is truly that of a little shield, the lower surface being concave, while the upper one has a corresponding degree of convexity, and the umbo projects from its centre in the form of a small cone. The diameter of an average-sized one was $\frac{1}{1200}$ inch, and the height very nearly equalled the diameter.

Spongilla Batesii, Bowerbank.

Sponge massive, sessile; surface spiniferous; superficial interspaces open. Oscula, pores, and dermal membrane obsolete. Skeleton-spicula fusiformi-acerate, large, and stout. Ovaries spherical, spiculous, encased in an irregular but very open reticulate envelope; spicula of envelope acerate, stout, slightly curved. Ovary-surface tuberculate; tubercles short and very broad. Spicula of the ovaries, of exterior surface fusiformi-acerate, entirely spined, minute; spines of the middle portion large, cylindrical, terminations obtuse. Spicula of the interior surface umbonato-scutulate, minute.

Colour, dried state, pallid green.

Hab. River Tapajos, tributary to the Amazon, on the pendent branches of trees (*Mr. Bates*).

Examined in the dried state.

I received three fine specimens of this species from Mr. Bates. He describes them as being "found attached to stems and branches of trees which are submerged for three months in the wet season," and that "they are plentiful in the deep gloomy ygapos." The three specimens are very similar in form and dimensions, being of the size and shape of a common fowl's egg. Two of them only partially embrace the stems on which they are seated; the third entirely surrounds it. One of the specimens is evidently young; it is of a lighter green colour than the others, uniform in its structure, and has but few gemmules; and several of these are small and not fully developed. In the other two the greater part of the skeleton of each is brown, and has a dead appearance; and this portion is totally destitute of gemmules. United organically to the dead portions of the two Sponges, there are in each one or two patches of the skeleton which were evidently in a living state when collected. They are of a fresh dark green colour, and abound with mature ovaries; so that it would appear that the species is so far an annual that when the portion produced at one period has fulfilled the important offices of reproduction, and has shed its ovaries, its existence is then terminated.

The surface of the Sponge is strongly and rigidly spiniferous, and the superficial interspaces large and open, without the slightest vestige of either investing membrane or reticular structure to close the apertures.

The ovaries are not immediately at the surface, but a slight distance

below it. In the dried condition they are semiglobose, much smaller than the envelope in which they are contained, and are strongly tuberculated. When expanded by immersion for a short period in water, they assume a globose form and fill the envelope completely, the large coarse tubercles passing through the interstices of the network, and projecting considerably beyond it; and it is evident that the tuberculation is due to the powerful constriction of the surrounding network of the envelope, and there are no depressions on the inner surface of the ovary corresponding to the elevations on its exterior.

The manner in which the ovary is encased is very remarkable. There is a single large basal ring of spicula surrounding the foramen, at a distance from it of twelve or fifteen degrees, the whole circumference of the ring being composed of seven or eight spicula cemented together by their points, and rarely being more than two spicula thick. From this basal ring other spicula are projected, usually from the apical junctions, and a coarse net or basket-work is thus formed around the ovary—the size and form of the interstices being determined by the length and direction of the spicula. The ovaries are not sessile on the skeleton, but are elevated from the fibre on two or three short slender pedicels of spicula, and groups of six or eight of them are often clustered together in the large interspaces of the Sponge, mutually supporting each other by a number of these short pedicels, the greater part of the group having no connexion with the fibres of the skeleton.

The minute, entirely spined, fusiformi-acerate spicula of the exterior of the ovary are disposed without order in the substance of its walls, immediately beneath its surface, and appear to abound more especially in the large tubercles: and they are not visible under any circumstances until after preparation of the ovary by the aid of a slight boiling in nitric acid. At each end of the spiculum the spines are not very strongly produced, but towards the middle they are frequently as long as its greatest diameter; they are cylindrical in form, and terminated very obtusely. The spicula are very minute, and vary considerably in size; a large one measured $\frac{1}{384}$ inch in length, and one of the smallest was $\frac{1}{682}$ inch long.

The scutulate spicula are imbedded immediately within the inner surface of the ovary. They are closely packed together, and there appear to be two or three layers—the concave surface of the scutulum being towards the inner surface of the ovary. The diameter of an average-sized scutulum measured $\frac{1}{763}$ inch. The umbo is conical and acutely terminated.

Spongilla corallioides, Bowerbank.

Sponge somewhat fan-shaped, sessile, branching and anastomosing; surface smooth and even. Oscula numerous, small, arranged in linear series on the outer sides of the branches, nearly equidistant, very slightly elevated. Pores inconspicuous. Dermal membrane thin and translucent, aspiculous. Spicula of the skeleton farcimulo-

cylindrical, very short and stout. Ovaria, form unknown, furnished with numerous scutulate spicula.

Colour, in the dried state, light ash-grey.

Hab. River Winguay, near Salto Grande, South America (*W. Bragge, Esq.*).

Examined in the dried state.

This interesting species was brought from the interior of South America by Mr. W. Bragge, who presented it to the Museum of the Royal College of Surgeons. In a letter to Prof. Quekett he states that it was "from the River Winguay, a branch of the Penk, from near Salto Grande, above Paysandu; it had a mass of red sandstone for its base when found." Salto Grande is on the River Japura, lat. 0° 28′ S., lon. 72° 37′ W. This river is discharged into the Amazon near Alvarens.

The Sponge is 9 inches high, 7 inches broad, and varies from 2 to 3 inches in thickness. It has a nearly square outline; and, in the dried state, both in rigidity and general appearance it very closely simulates a mass of finely branched coral. It is composed of a series of anastomosing branches, two or three lines in diameter, forming together a thick, somewhat fan-shaped mass. The surface of the branches is smooth and even, or slightly undulating; and they frequently assume an oval form from the influence of the opposite linear series of oscula, which are usually from two to three lines distant from each other.

The oscula rarely exceed half a line in diameter, and have usually a slightly thickened and elevated margin. I could not detect pores in the few pieces of dermal membrane that I found remaining on the Sponge; and both the dermal and interstitial membranes are thin and very delicate in texture. The skeleton-spicula are curved, and are remarkably short and stout: an average-sized adult one measured, length $\frac{1}{150}$ inch, greatest diameter $\frac{1}{857}$ inch; so that they are less than six times their own diameter in length. Among the large cylindrical spicula there were a few comparatively slender acerate ones; the dimensions of one of them was, length $\frac{1}{200}$ inch, diameter $\frac{1}{2000}$ inch. These spicula, although differing in form from the adult skeleton-ones, are only an early stage of their development, and they may be traced through all stages of their growth, from the acutely acerate to the hemispherically terminated adult spicula. The young as well as the old spicula are remarkably solid, and it is only by the aid of incineration that a very small central cavity can be detected in them. In one of the small pieces of the Sponge, mounted in Canada balsam, I found a fragment of an ovarium imbedded amidst the spicula of the skeleton. In this fragment the foramen was well preserved; and immediately around this orifice were numerous minute mammillæ at nearly equal distances from each other. A few of these elevations exhibited a tolerably distinct circular line around them, indicating, in a manner that admitted of little doubt, that they were scutulate spicula, very similar in size and structure to those of the ovaria of *S. Brownii* and *S. Batesii*, with the spicula of which species they appeared to coincide as nearly as possible in size. No other

form of spiculum was associated with them in this fragment of an ovarium; nor could I by the most careful examination of the fragments of the Sponge in my possession detect any other remains of the ovaria. Among the spicula separated by incineration, I found a single acuate spiculum of the following dimensions:—length $\frac{1}{231}$ inch, diameter $\frac{1}{2000}$ inch. These proportions are very nearly in accordance with those of the skeleton-spicula, and it is very probable that it has belonged to the case of one of the gemmules of this Sponge, especially as it is different from the spicula belonging to any of the known species of *Spongilla* from the River Amazon.

A portion of the sarcode still remains in the Sponge; and when expanded in water, it has a golden-yellow colour, and has a dense gelatinoid appearance.

SPONGILLA LACUSTRIS, Johnston.

Ephydatia canalium, Fleming.
Halichondria lacustris, Fleming.

Sponge sessile, branching; surface more or less hispid. Oscula simple, dispersed, small, and numerous. Pores inconspicuous. Dermal and interstitial membranes pellucid, spiculous; spicula numerous, fusiformi-acerate, entirely spined; spines abundant, conical, acute. Skeleton-spicula subfusiformi-acerate. Ovaria subglobose; spicula acerate, much and variably curved, disposed at right angles to lines radiating from the centre of the ovaries, entirely spined; spines conical, acute.

Colour dark green.

Hab. Lakes and rivers of England and Scotland.

Much uncertainty has existed regarding the specific distinctions belonging to the two well-known European species of *Spongilla*; and I can only attribute this indecision on the part of naturalists to their having hitherto appealed to the characters of external form and substance as a means of discrimination, to the almost total exclusion of those of internal structure, in which may be found striking and unfailing specific differences which never vary under any circumstances of locality or modification of external form.

Dr. Fleming has justly characterized this species as being "massive, rising into short rounded branches; the fibres are coarser and the substance denser than those of *S. fluviatilis*; the spicula, too, though similar in form, are thicker and about one-fourth shorter." This description, when both species are attainable, is good as regards the differential characters; but fortunately there are essential characters of much higher value, which exist in the spicula of the dermal membrane and in those of the ovaria, neither of which have, I believe, been noticed by previous writers on these subjects. Those of the dermal membrane are, under ordinary circumstances, very indistinct. If we examine the membrane in water between glasses, the spicula, as they lie immersed in the sarcode, are scarcely to be detected; but if previously mounted in Canada balsam, they become at once distinctly visible; they are very numerous, and are disposed over the

membrane without any approximation to order, and have an average length of $\frac{1}{222}$ inch, and are $\frac{1}{3333}$ inch in greatest diameter. They vary to some extent in their dimensions; but their form is always fusiformi-acerate, the spines are abundant, conical, and acutely terminated at all parts of the spiculum, but are not very strongly produced. The interstitial membranes are also plentifully supplied with the same description of tension-spicula as those of the dermal membrane. The dermal membrane of *S. fluviatilis* is aspiculous, and in this character therefore we possess an organic difference in the structure of the parts which leads us at once to a definite and correct mode of determining the species, however closely they may simulate each other in form.

The skeleton-spicula also differ in form from those of *S. fluviatilis*: in the latter they are purely acerate—that is, having the same diameter throughout the greater portion of the shaft of the spiculum, and attenuating only towards the terminations; while in the former the spicula are stouter and shorter in their proportions, and the attenuations commence at or very near the middle of the shaft of the spiculum, and are therefore fusiformi-acerate in shape.

But the greatest organic difference between this species and *S. fluviatilis* exists in the spicula of the ovaries. In the latter the case of that organ is strengthened and supported by a number of birotulate spicula, the rotulæ supporting the inner and outer surfaces of the case of the ovary, the shafts of the spicula being disposed at right angles to the surfaces; while in *S. lacustris* the walls of the ovary are totally destitute of birotulate spicula, but in their place we find a considerable number of curved, acerate, spinous spicula, not disposed at right angles to the surface of the gemmule, but imbedded in and lying parallel to the surface of that organ, thus affording a specific distinction so strikingly different from the corresponding structures in *S. fluviatilis* as to render the discrimination of the species easy and certain whenever the ovaries are present.

This species occurs plentifully at the bottom of the West Country Timber-dock, on the south side of the Thames, near Rotherhithe. It may frequently be found attached to the lower part of the large mooring-posts near the central parts of the docks, about 8 or 10 feet deep. I have never found it in this locality in shallow water or near the surface like *S. fluviatilis*, which is also abundant in the same dock attached to the floating timber. On the contrary, at Cookham, a few miles beyond Maidenhead, this species is abundant on the posts and sides of the wharfing-boards; and here it is always found near the surface of the water, and has a very fine emerald-green colour.

SPONGILLA ALBA, Carter.

Sponge sessile, encrusting, massive or subramose; surface rugged. Oscula simple, large, congregated in groups, confluent. Pores inconspicuous. Dermal membrane thin, pellucid, furnished with an irregular network of minute, slender, curved, entirely spined, acerate spicula; spines obtuse. Interstitial membranes abundantly furnished

with the same spicula as those of the dermal membrane. Skeleton-spicula fusiformi-acerate, large, and stout. Ovary-spicula disposed at right angles to lines radiating from its centre, cylindrical, stout, curved, entirely spined; spines acute, those at the ends of the spicula recurved.

Colour, alive, yellow, occasionally green (*Carter*).

Hab. Tanks, Bombay (*Carter*).

Examined in the dried state.

Mr. Carter, in his excellent paper on the "Freshwater Sponges in the Island of Bombay," describes this species as having a "flat or elevated surface, slightly convex, presenting gentle eminences or depressions or irregularly formed projections." The whole of these characters of form, there is no doubt, are correct as regards particular specimens. The mass for which I am indebted to Mr. Carter is a complete specimen about 3 inches in diameter, and exceeding 2 inches in height, having several short, stout, ramifying branches thrown out from its surface precisely as described by him, in the observations following his specific descriptions, as occurring when the species is found in circumscribed portions.

The oscula are large, and, in the specimen under consideration, they are not scattered, but are congregated in distinct groups in consequence of the convergence of the excurrent canals on particular parts of the surface of the Sponge; in the specimen under consideration there are four such groups, in which the oscula are all more or less confluent, forming in three out of the four cases a common orifice exceeding half an inch in diameter. This character is exceedingly striking, and does not appear to occur in any other species described as being found at Bombay.

The disposition of the spicula in the dermal membrane is very variable: sometimes they form a well-defined uniserial or biserial network; while at others they are dispersed in great profusion and without any approach to arrangement. They are long and slender in their proportions, and vary considerably in the amount of curvature they assume; and the obtuse spines with which the whole of the shaft is furnished are most abundant. They are small towards the apices of the spiculum, and increase in size as they approach the centre of the shaft, where they often attain an altitude equal to the largest diameter of the spiculum on which they are based, and they are nearly of the same diameter from base to apex. The same description of spicula are abundantly dispersed in the interstitial membranes, but do not appear to approach in any degree a reticulated arrangement.

The spicula of the ovaria are imbedded irregularly in the surface of its coriaceous coat; they slightly exceed in length those of the dermal and interstitial membranes, but they are two or three times their greatest diameter. They vary considerably in the degree of their curvature, and attenuate slightly from the centre of the shaft towards each end of the spiculum. The spines with which they are furnished are most abundant at their terminations, where they are thickly clustered, and are very much curved in the direction of the

central portion of the shaft, towards which part they are also fewer in number and less both in height and curvature: unlike those of the dermal membrane, the spines on these spicula are always acutely terminated.

To obtain a satisfactory definition of the spines of both these spicula, a power of about 600 linear should be used. The acerate spicula of the skeleton are about three times the length of those of the ovaria, and are also three or four times their diameter.

SPONGILLA CEREBELLATA, Bowerbank.

Sponge massive, sessile; surface furnished abundantly with short compressed branches, finely hispid. Oscula large, numerous, dispersed. Pores inconspicuous. Dermal membrane thin, translucent, spiculous; spicula slightly curved, cylindrical, entirely spined; spines of the middle of the shaft cylindrical; terminations obtuse, expanded or branched; spines towards the ends of the shaft conical, acute, recurved. Ovaria globose, smooth; spicula disposed more or less at right angles to lines radiating from the centre of the ovarium, of the same form as those of the dermal membrane.

Colour, dried state, light grey.

Hab. Freshwater tanks near Aurungabad, dominions of the Nizam, East Indies (*Dr. Bradley*).

Examined in the dried state.

I received this *Spongilla* from my friend Mr. Henry Deane, of Clapham, who informed me that it was sent to him from the East Indies by Dr. Bradley, who was in the service of the Nizam, and who had it sent to him from some water-tanks about 100 miles from Aurungabad, in the Nizam's dominions. Its dimensions are 6 inches in length, 4 inches in width, and 2½ inches in height. The general surface is very irregular and cavernous, and has much resemblance to the surface of the brain of an animal; towards one end these irregularities are developed into short compressed branches, the surfaces of which are even and minutely hispid. The general texture of the Sponge is exceedingly friable, and the short branches afford nearly the only parts of the surface which has the dermal membrane remaining upon it. The dermal membrane is very thin and translucent, and is furnished with slightly curved, cylindrical, entirely spined spicula, the spines of which at the middle of the shaft are stout and cylindrical, with obtuse or expanded and sometimes slightly branched terminations, while those towards the ends of the shaft are acutely conical and are curved backwards towards the middle of the shaft. The ovaria are imbedded in every part of the Sponge in remarkable profusion; when expanded by immersion in water, they are perfectly globular, and have a smooth surface; when viewed by the aid of a Leiberkuhn and a power 100 linear, the spicula are so far imbedded as to be scarcely visible. They are of the same size and form as those of the dermal membrane. The imbedment of the spicula in the wall of the ovary is rarely parallel to the outer surface, nor are they confined to that part of the wall as in some closely allied species, but are dispersed throughout the whole of its substance, at various

angles to the surface of the ovary, without any arrangement; but in no case do they appear to be projected in lines radiating from the centre of that organ.

The only *Spongilla* with which this species might be confounded is *S. alba*, from the tanks of Bombay; but the oscula are not congregated in groups as in that species; and the spicula of the ovaries, although of the same form as those of *S. alba*, differ from them in being profusely furnished with numerous stout, cylindrical, more or less obtuse spines near the middle of the shaft; while the spines near the middle of the shaft of those of *S. alba* are fewer in number, not so strongly produced, and are conical and acutely terminated.

SPONGILLA LORDII, Bowerbank, MS.

Sponge sessile, coating; surface even, smooth. Oscula simple, dispersed. Pores inconspicuous. Dermal membrane pellucid, aspiculous. Skeleton-spicula acerate. Ovaria congregated on the basal membrane, very numerous; spicula entirely spined, fusiformi-cylindrical, dispersed on the surface. Basal membrane abundantly spiculous; spicula dispersed, same as those of the ovaries.

Colour ochreous yellow to green.

Hab. Lake Osogoos, and other lakes and rivers tributaries to the Columbia River; on the east slopes of the Cascade Mountains, about 6000 feet above the level of the sea (*Mr. J. H. Lord*).

Examined in the dried state.

The Sponge embraces the stems of a large species of reed for 8 or 10 inches of its length, and is about 6 or 9 lines in greatest thickness. In its general habit and the structure of its skeleton it closely resembles our British *S. fluviatilis*; but it differs from that species in the mode of disposition and structural peculiarities of the ovaries, which more closely resemble those of our British *S. lacustris*, from which, however, it differs in having the spicula of the ovaries nearly straight, while those of the last-named species are usually arcuate. The dermal membrane of *S. lacustris* also abounds in entirely spined tension-spicula, while that of *S. Lordii* is aspiculous.

There is a peculiarity in many of the spicula of the ovaria that I have never before seen in those of any other known *Spongilla*; and that is, the radiation of secondary canals from the central one of the spiculum to the outer surface. These secondary canals sometimes terminate in spinous projections; but this is not always the case.

I observed fragments of similar spicula in the infusorial earth from Duval's Creek, near Lake Munroe, St. John's River, Florida, sent to me by the late Prof. Bailey, of New York. It is therefore probable that *S. Lordii* will be found in the lakes and rivers of that district as well as at Vancouver's Island. This species is interesting from its close alliance in structure to the European type species of the genus, and from the very slight structural resemblance it has to the numerous species of the Amazon River, the principal characters by which it is connected with the latter series of species being the mode of the congregation and disposition on its basal membrane of its very numerous ovaries.

I have dedicated this species to Mr. Lord as a slight acknowledgment of the good services he has rendered to science by the collection of this and numerous other valuable specimens of natural history from unfrequented regions which he has explored.

SPONGILLA DAWSONI, Bowerbank.

Sponge sessile?, branching; surface smooth. Oscula and pores inconspicuous. Dermal and interstitial membranes abundantly spiculous; spicula fusiformi-acerate, entirely spined; spines numerous, short, and conical. Skeleton-spicula acerate or subfusiformi-acerate. Ovaria spherical; dermal spicula numerous, disposed in flat fasciculi, or groups of spicula parallel to each other; groups irregularly dispersed; spicula acerate or subcylindrical, entirely spined; spines numerous, obtuse, and ill-defined. Sarcode aspiculous.

Colour, in the dried state, emerald-green.

Hab. River St. Lawrence, Montreal, Canada (*Dr. Dawson, Mr. Fowler,* and *Rev. A. Kemp*); a lake near Brockville (*Rev. A. Kemp*).

Examined in the dried state.

About two years ago I received a small fragment of this species from Dr. Dawson, who stated that it was found in the River St. Lawrence, at Montreal; but, as the fragment was destitute of gemmules and very small, there were not sufficient characters to warrant a specific description of it. In October 1859 I received from the same gentleman a further supply of fragments of this species, containing ovaria, and giving a better idea of its form than those first sent to me. The largest of the pieces sent was $1\frac{1}{2}$ inch in length and $2\frac{1}{2}$ lines in diameter, evidently a portion of a longer branch. At the proximal end there is a short branch, 3 lines in length and 1 line in diameter; and the distal end divides into two small branches of similar dimensions to the first, thus satisfactorily indicating the branching habit of the species. In several parts of this piece there are ovaries imbedded in the Sponge, and there were many others in the fragments of the same species that accompanied it. The general external characters appear very like those of the European species *S. lacustris*; and, from this similarity, I have very little doubt of its surface in the living state having been smooth and even, as in that species. In the European species the branches spring from a broad spreading base, about half an inch in thickness; and I think it highly probable that the American species will be found to possess the same habit. I could not detect oscula on any of the fragments in my possession.

The dermal and interstitial membranes abound with tension-spicula, and especially the dermal one, in which they seem to attain their fullest degree of development. Their normal form is fusiformi-acerate; but, from the abundant production of the spines at their terminations, they frequently appear to be cylindrical rather than acerate. They are dispersed on these tissues rather unevenly, abounding in some spots, while they are comparatively scarce in others.

The spicula of the skeleton are of about the same proportions as

those of the European species. They are usually of the regular acerate form, but occasionally become subfusiform.

The spicula and their mode of arrangement in the dermis of the ovarium cannot be readily seen without the aid of treatment with hot nitric acid, in which they should be immersed for a few seconds, and the acid should then be immediately diluted with water, after which they should be dried on the glass on which they are to be mounted in Canada balsam. The spicula in the dermis of adult ovaries are very abundant. They are similar in form and proportions to those of the dermal membrane; but, generally speaking, they are more fully produced, and the greater portion of them are subcylindrical from the profusion of spines at their apices. Their form and mode of arrangement in the ovary render them exceedingly valuable as specific characters. In some of the young and incompletely developed ovaries I could not detect a single specimen of these spicula. The only difference I could find between these spicula and those of the dermal membrane was, that the spines on those of the latter were more sharply and fully produced, while on those of the ovary they were frequently ill-defined and often only in an incipient state, but very abundant.

In the preparation of the spicula for examination I found a few birotulate ones having the rotulæ very deeply divided. These spicula were no part of the Sponge in course of description, but were undoubtedly from the gemmules of another species inhabiting the St. Lawrence.

SPONGILLA CINEREA, Carter.

Sponge sessile, massive; surface even. Oscula numerous, dispersed, large, more or less depressed. Pores conspicuous. Dermal and interstitial membranes spiculous; spicula fusiformi-acerate, small, entirely spined. Skeleton-spicula fusiformi-acerate, incipiently spinous. Ovaries globose; spicula acerate, slightly curved, entirely spined; spines conical, acute, at right angles to the shaft; spicula disposed at right angles to lines radiating from the centre of the gemmule.

Colour dark purple or rusty copper (*Carter*).

Hab. Freshwater tanks, Bombay.

Examined in the dried state.

Mr. Carter says of this Sponge, "While the investing membrane of this species remains intact, its surface presents a dark rusty copper-colour, purplish under water. It never appears to throw up any processes, and extends over surfaces of 2 and 3 feet in circumference, or accumulates on small objects to the thickness mentioned. It is distinguished from the other species by its colour, the fineness of its texture, and the smallness of its seed-like bodies and spicula."

I have received three specimens of this species from Mr. Carter; in all of them the oscula are large and considerably depressed, and the spaces between them generally abound with, comparatively, large and very conspicuous pores, which are not depressed like the oscula,

but present a sharp membranous margin level with the adjoining surface.

The spicula of the dermal membrane are not very numerous; they are slightly curved, and are entirely and abundantly spinous; and the spines are not in an incipient state, as on those of the skeleton, but are fully and distinctly produced; their spinous character is not usually distinctly apparent while *in situ*, in consequence of the density and colour of the sarcode and the abundance of the molecules imbedded in it; but when separated, there can be no mistake regarding them. These spicula are also found imbedded in the interstitial membranes, but they are comparatively rare in those tissues.

The incipient spines of the spicula of the skeleton are few and minute, and require a power of about 400 linear to render them distinct to the eye, and, unless it be on large and fully developed spicula, they are frequently indicated only by a slight elevation of the profile lines of the spicula.

Although in some points of organization this species is the representative in India of our European *S. lacustris*, there is no similarity whatever in external form: while *S. lacustris* is always arborescent, the Indian one is always sessile and coating, rarely attaining an altitude exceeding an inch. In *S. lacustris* the skeleton-spicula are acerate, of nearly the same diameter for the greater portion of their length; while in *S. cinerea* they are distinctly fusiformi-acerate, gradually attenuating from the middle of the shaft towards each end; they are also larger and have a greater length than those of *S. lacustris*, measuring $\frac{1}{75}$ inch long, while the latter is but $\frac{1}{90}$ inch long, and are entirely destitute of incipient spines.

In the size of the ovaries of the two species the proportional diameters are the reverse of the measurements of the skeleton-spicula. The largest ovary is that of *S. lacustris*, $\frac{1}{40}$ inch in diameter, while that of *S. cinerea* is but $\frac{1}{66}$ inch in diameter.

The mode of disposition and the form of the dermal spicula of the gemmules of the two species is very similar: they are each abundantly spinous and variable in size; but those of *S. cinerea* are all only slightly curved, while those of *S. lacustris* are frequently curved to so great an extent as to form a semicircle. In length they are as nearly as possible equal; but in *S. lacustris* they have a diameter twice as great as those of *S. cinerea*, the average diameter of the latter being $\frac{1}{7500}$ inch, while that of the former is $\frac{1}{3649}$ inch.

SPONGILLA CARTERI, Bowerbank.

S. friabilis, Carter.

Sponge sessile, massive; surface even. Oscula numerous, dispersed. Pores conspicuous. Dermal and interstitial membranes thin, pellucid, aspiculous. Skeleton-spicula fusiformi-acerate, stout. Ovaries subglobose; spicula fusiformi-acerate, disposed at right angles to lines radiating from the centre of the ovary, short, and stout.

Colour bright green.

Hab. Freshwater tanks, Bombay (*Carter*).

Examined in the dried state.

This species is not *S. friabilis*, Lamarck, the ovaries of which are furnished with birotulate spicula, while those of the like organs in the Sponge under consideration are fusiformi-acerate. I have therefore named it after the author who first described it, in commemoration of the valuable services he has rendered to science in this and other departments of natural history.

In the absence of specimens of the European species *S. friabilis*, Lamarck, or *S. fluviatilis* of Johnston, and with the vague and meagre description only of that Sponge before his eyes, it is by no means a matter of surprise that Mr. Carter should have believed the Bombay Sponge to be the same species as the European one. The skeleton-spicula of the two species do not differ very materially from each other: those of *S. friabilis*, Lam., are longer and more purely acerate in form, having a length of $\frac{1}{72}$ inch, and being $\frac{1}{1804}$ inch at their greatest diameter; while those of *S. Carteri* are $\frac{1}{75}$ inch long, the greatest diameter being $\frac{1}{1345}$ inch, and in consequence of their greater proportionate diameter they are distinctly fusiformi-acerate.

The spicula of the ovaries are, in comparison with those of the ovaries of other species of *Spongilla*, very large and stout; an average-sized one measured gave the following dimensions:—length $\frac{1}{143}$ inch, greatest diameter $\frac{1}{2727}$ inch.

The above-named author, in his paper, states that this Sponge "seldom throws up projections much beyond its surface, does not appear to be inclined to spread much, and is matted and confused in its structure towards its base and round its seed-like bodies."

SPONGILLA PAUPERCULA, Bowerbank.

Sponge coating and branching; surface smooth. Oscula and pores inconspicuous. Dermal membrane aspiculous. Skeleton-spicula fusiformi-acerate, stout, and rather short. Interstitial membranes aspiculous. Sarcode aspiculous. Ovaries globular, smooth; spicula acerate, small, few in number.

Colour, in the dried state, light brown.

Hab. In the water-pipes of Boston, United States (*Prof. J. W. Bailey*, New York; *Dr. Asa Gray*, Cambridge, near Boston, U.S.).

Examined in the dried state.

I am indebted to Dr. Asa Gray for specimens of this species. They consist of a number of fragments of branches, the longest of which rather exceeds an inch in length, and are of about the diameter of a goose-quill. The general character of the Sponge appears to be very similar to that of our European species *S. lacustris*; but it is not so strongly constructed: and this may perhaps arise from the peculiarity of its place of growth; in a more genial locality it would probably be much more robust in its general habit, and the ovaria, it is probable, would be more fully and completely developed and more abundantly supplied with their proper spicula, which are of the same form as those of the skeleton, but not more than about half their size: these appear to be very few in number, and to be irregularly dispersed on their surface.

In a letter from the late Prof. J. W. Bailey, dated November 30,

1856, he writes, "I forgot to mention that *Spongilla* grows abundantly in the water-pipes by which the city of Boston is supplied with water from a small lake. I think it must materially diminish the water-way in the pipes, and probably be connected with the bad taste which the water has in seasons of great drought." With the latter part of these observations especially I am strongly inclined to concur, as I have always observed that a small portion of either of our European species rapidly deteriorated a comparatively large body of water to such an extent as to render it unfit to sustain either its own life or that of any other animals of higher organization. The encouragement of *Confervæ* in tanks supplied with such water would probably help to correct the deleterious effects of the *Spongilla*.

EXPLANATION OF PLATE XXXVIII.

Fig. 1. *Spongilla fluviatilis.*—*a.* A spiculum of the skeleton, × 108 linear. *b.* A birotulate spiculum of the ovaria, ×660 linear. *c.* A view of the external surface of a rotula, ×660 linear.

2. *S. Leidii.*—*a.* A spiculum of the skeleton, ×108. *b.* A birotulate spiculum of the ovaria, ×660.

3. *S. Capewelli.*—*a.* A spiculum of the skeleton, ×108. *b.* A birotulate spiculum of the ovaria, ×660. *c.* A view of the external surface of a rotula, ×660.

4. *S. Meyeni.*—*a.* A spiculum of the skeleton, ×108. *b.* A birotulate spiculum of the ovaria, ×660.

5. *S. plumosa.*—*a.* A spiculum of the skeleton, ×108. *b.* A birotulate spiculum of the ovaria, ×660. *c.* A view of the internal surface of a rotula, ×660. *d.* An elongate pileated spiculum, an early condition of the subsphero-stellate form, ×400. *e.* A fully developed multiradiate, subsphero-stellate, pileated spiculum of the sarcode, ×400.

6. *S. Baileyi.*—*a.* A spiculum of the skeleton, ×108. *b.* A birotulate spiculum of the ovaria, ×660. *c.* One of the tension-spicula of the membranes, ×660.

7. *S. gregaria.*—*a.* A spiculum of the skeleton, ×108. *b.* One of the spicula of the case of an ovarium, without spines, ×108. *c.* A spiculum of the case of an ovarium, abundantly spinous, ×108. *d.* A side view of one of the birotulate spicula of an ovary, ×1100. *e.* A view of the external surface of a rotula, ×1100.

8. *S. paulula.*—*a.* A spiculum of the skeleton, ×108. *b.* One of the inequibirotulate spicula of the ovaria, ×660.

9. *S. reticulata.*—*a.* A spiculum of the skeleton, ×108. *b.* A boletiform spiculum of the ovaria, ×660.

10. *S. recurvata.*—*a.* A spiculum of the skeleton, ×108. *b.* A slender boletiform spiculum of the ovaria, ×660. *c.* A multihamate, birotulate spiculum from the ovaria of the same Sponge, ×660.

11. *S. Brownii.*—*a.* A spiculum of the skeleton, ×108. *b.* One of the spicula of the reticular case of an ovarium, ×108. *c.* An umbonato-scutulate spiculum of the ovaria, showing the external surface, ×660. *d.* A side view of one of the same form of spiculum represented by fig. *c*, ×660.

12. *S. Batesii.*—*a.* A spiculum of the skeleton, ×108. *b.* An entirely spined fusiformi-acerate spiculum from the outer surface of an ovarium, ×660. *c.* One of the umbonato-scutulate spicula from the inner portion of the wall of an ovarium, ×660.

13. *S. corallioides.*—A spiculum of the skeleton, ×108.

14. *S. lacustris.*—*a.* A spiculum of the skeleton, ×108. *b.* A fusiformi-

acerate, entirely spined tension-spiculum from the dermal membrane, ×660. *c*. A subarcuate, acerate, entirely spined spiculum from the outer surface of an ovarium, ×660.

15. *S. alba*.—*a*. A spiculum of the skeleton, ×108. *b*. A fusiformi-acerate, truncately spined tension-spiculum from the dermal membrane, ×660. *c*. An entirely and recurvately spinous cylindrical spiculum from the surface of an ovarium, ×400.
16. *S. cerebellata*.—*a*. A spiculum of the skeleton, ×108. *b*. An entirely spined cylindrical spiculum from the surface of one of the ovaria, ×400.
17. *S. Lordii*.—*a*. A spiculum of the skeleton, ×108. *b*. An entirely spined fusiformi-cylindrical spiculum from the surface of one of the ovaria, ×660.
18. *S. Dawsoni*.—*a*. A spiculum of the skeleton, ×108. *b*. A subcylindrical, entirely spined spiculum from the surface of an ovary, ×400.
19. *S. cinerea*.—*a*. A spiculum of the skeleton, ×108. *b*. An entirely spined acerate spiculum from the surface of an ovary, ×660.
20. *S. Carteri*.—*a*. A spiculum of the skeleton, ×108. *b*. A small fusiformi-acerate spiculum from the surface of an ovary, ×108.
21. *S. paupercula*.—*a*. A spiculum of the skeleton, ×108. *b*. An acerate spiculum from the surface of an ovary, ×108.

2. On some Insects collected in Madagascar by Mr. Caldwell. By H. W. Bates, Esq.

A small collection of insects made in Madagascar by Mr. Caldwell (the second remitted by that gentleman) having been placed in my hands for examination by Dr. Sclater, I now communicate the results to the Society. Unfortunately the specimens arrived in a very dilapidated condition, owing to their not having been securely pinned in the box; so that many are not now in a state to be identified, thus reducing the number of species in our already scanty list. Twenty-seven only are here passed in review, which, added to the twenty-one named from the former collection by Messrs. Hewitson and Walker, make the small total of forty-eight. A rather large number of insects, however, chiefly of the orders Coleoptera and Lepidoptera, have now been described from Madagascar, sufficient, perhaps, to give us a pretty fair idea of the entomological fauna of the island. It has occurred to me, therefore, that it would be worth while to analyze the whole list, so as to ascertain how far this department confirms what has been advanced by the cultivators of other branches of zoology, especially ornithologists, as to the very high degree of peculiarity of the fauna.

The literature of the entomology of Madagascar dates from towards the end of the last century, when Olivier in his 'Entomologie' figured and described a small number of Coleoptera from the island, which had been deposited by Commerson in the Museum of the Jardin des Plantes. In 1830 an ardent entomological collector, Justin Goudot, visited the island and reaped a rich harvest; in fact, nearly all that is known in Europe even now of the insects of Madagascar is the result of the researches of this practised hand. Goudot's expedition gave rise only to two special works, and these unfortunately were very limited: one was Klug's 'Insekten von Ma-

dagascar,' a treatise read before the Königliche Akademie der Wissenschaften of Berlin in 1832; and the other, Boisduval's 'Faune Entomologique de Madagascar,' &c., published in 1833. The former described little more than 200 Coleoptera; and the latter is confined to a portion of the Lepidoptera. The bulk of Goudot's collections, including all the striking and peculiar forms, seems to have been distributed chiefly amongst amateurs, who described the species irregularly in different French periodicals; many, however, have been systematically described in general monographs of families by various French authors. Since Goudot's time a few small collections made by Coquerel and others have arrived in France. The reopening of the island to Europeans has not yet produced results satisfactory to entomologists, as scarcely any of the rarer and more striking species collected by Goudot have been rediscovered.

The peculiarities of the Mammal fauna of Madagascar are so well known to zoologists that it is almost superfluous to mention them here. Such are the absence of Pithecoide Monkeys, Pachyderms (with the exception of one species at least of Wild Hog), Solidungula, Ruminants, and *Felidæ*, groups so richly represented in the adjoining continent,—and on the other hand, the presence of numerous genera and species of Lemurs unknown in every other part of the world, with two or more peculiar genera of *Viverridæ*, constituting, as far as is known, the small stock of Carnivora which the island possesses. The fauna, however, has been systematically treated only as far as birds are concerned, Dr. Hartlaub having contributed a special work on the subject. According to this learned ornithologist, the bird-population of Madagascar is in the highest degree peculiar. Dr. Hartlaub even goes so far as to deny any close relationship between it and continental Africa, hinting that its connexion lies rather with South-eastern Asia. The statistics given are certainly very striking: thus out of the total number of 202 birds no less than 96 species and 29 genera are peculiar to the island, 42 species only being common to it and continental Africa. The number of characteristic African groups wanting in Madagascar supplies almost a parallel to the case of the Mammalia. The facts which have suggested to him an Indian alliance are the existence in Madagascar and Mauritius of four Indian genera and three or four species, besides six other genera which, although peculiar to Madagascar, bear the stamp of Indian and Australian rather than of African origin.

An analysis of the Insect fauna, at least of eleven of the better-worked families or tribes in the orders Lepidoptera and Coleoptera, has yielded me the following results:—Out of 282 species (being all that have been described from the island, of the 11 groups), 221 species and 26 genera are peculiar to Madagascar; whilst 48 species only are common to the island and the continent. Thus there is a much larger proportion of species of insects than of birds peculiar to the island, and a somewhat smaller proportion common to it and Africa —a result which may perhaps be due to the more limited powers of locomotion of insects than of birds. The generic peculiarity of the island is perhaps not quite so strikingly exhibited in insects as in

birds—26 out of 90 genera of insects being peculiar, whilst in birds there are 29 genera out of 141—ornithological genera seeming to form groups of a lower rank than those usual in entomology. An examination of the Madagascar genera which are not African brings to light the Indian element, but not in so prominent a way as that claimed by Dr. Hartlaub as a result of his analysis of the bird fauna. For out of the 64 genera not peculiar to the island, no less than 61 are also represented in Africa—two only of the remaining three being Indian or South-east Asian forms, and the third Indian and American, but not African. Lastly, of the 26 exclusively Madagascar genera, all have their nearest relatives in African forms except two, and these are very remarkable; for one, the Cetoniade genus *Chromoptila*, claims for its next relative *Bombodes*, a Himalayan genus; and the second, the Cicindelide *Pogonostoma*, is closely allied to a purely Tropical American form, *Ctenostoma*,—the two genera indeed forming an isolated subfamily thoroughly distinct from any other group.

I think it will be admitted, notwithstanding these discrepancies, that there is a great general similarity in the results arrived at by Dr. Hartlaub's analysis of the birds and the present examination of a portion of the insects. The differences with regard to the relationship of the fauna, I think, tend to show that Dr. Hartlaub has rather overestimated the importance of the Indian element, and that Dr. Sclater's view, namely, that in Madagascar the African organic type is pushed to its extreme development, lies much nearer the truth. Why should Indian rather than African relationship be claimed for the Madagascar fauna, when, according to his own showing, only three or four Indian species with four genera are contained in it, whilst it has 42 African species and 23 African genera?

If the existence of a small number of Indian or Archipelagic genera in Madagascar and Mauritius, unknown in continental Africa, be a fact which must influence our views of the Madagascar fauna, so must also the occurrence of a genus having a near relationship only to a Tropical American form, especially as this latter is not a solitary fact—another Madagascar insect (belonging to a family which I have not included in this examination), namely *Urania ripheus*, belonging (or having been considered until very lately to belong) to a purely Tropical American genus. The presence of these anti-African elements, the absence of so many families and orders of Mammalia common on the neighbouring continent, and, lastly, the existence of numerous genera and species quite peculiar to the island constitute, doubtless, the main features of the fauna of Madagascar. The peculiarity of the endemic genera and species, however, must not be overrated through dwelling too much on the great singularity of a few of them. There are extremely few entire families or subfamilies wholly peculiar to this island; indeed in the portion of the insect fauna which I have examined there are none, and in the birds there are only two small families of this kind, each of which is represented by a single genus. Were Madagascar a distinct zoological province, as some naturalists have seemed inclined to maintain, there ought to

be, as in the South American, Australian, and Indian provinces, many such groups with clusters of peculiar genera and species. It might be said that, with the exception of the absence of so many groups of continental Mammals, Birds, and other classes, the peculiarities of Madagascar are not very much greater than those of some areas of similar dimensions forming parts of a continuous continent. There are areas of this size in Tropical America which contain numbers of genera and species in various classes, some of them highly peculiar, found nowhere else on the same continent. Regarding the existence of anti-African types, it must not be forgotten that many countries contain one or more isolated forms which are more nearly related to others of distant regions than to those of their own. Africa itself contains, in the midst of a fauna completely distinct, a few scattered Tropical American genera—that is, genera found in these two lands, and nowhere else on the globe. *Lepidosiren* is one of these, and *Hiletus*, an equally anomalous genus of Coleopterous insects, another.

The view taken by Dr. Hartlaub, were it pushed to an explanation, would naturally lead to the hypothesis that Madagascar with its islands was once more isolated from Africa than from lands since submerged in the Indian Ocean, containing a fauna of an Indian character; for on such a supposition only could the predominance of Indian over African features be explained, if it were true. But if the independence and peculiarity of its fauna be more insisted on, we should have to suppose that the island is the site of an ancient tract of land in the Indian Ocean, which had throughout long ages maintained an independent fauna. It seems to me, however, that the peculiar organic features of Madagascar would be better explained by supposing that the island (whether previouly stocked with anti-African forms, or not) was at one time much more closely connected with Africa than it now is, and that the time of connexion was anterior to the date when the continent became peopled by *Simiidæ* and the bulk of its present Mammalia, but posterior to the introduction of Lemurs. Subsequently to this epoch we may suppose it to have become isolated as we now find it; the lapse of time since the severance having been sufficient to cause the present divergence of the faunas—a divergence caused, however, as much by the extinction of old forms on the continent, once common to both lands, through the immigration or introduction of so many new ones, as by the origination of new species and genera in Madagascar allied to prototypes once common to island and continent. The changes in the Madagascar fauna have not been carried on in all the groups, a family here and there only having shown this multiplication of genera and species. As proof of this, I may mention that out of the 26 genera of insects peculiar to Madagascar, no less than 17 belong to one (the *Cetoniadæ*) out of our 11 groups; the Lemurs may possibly be a similar case.

It must be confessed, however, that our knowledge of the faunas of these lands is not yet sufficient to enable us to come to sound conclusions on these interesting subjects. These remarks must be

taken merely as a sketch of an hypothesis under which labourers in the field of Madagascarene and African zoology may, if they choose, collect and apply their facts.

Order LEPIDOPTERA.

1. PAPILIO PHORBANTA, Linn.

This species, of which there is one example only in the collection, is stated by Dr. Boisduval, our chief authority on the Lepidoptera of this part of the world, to be peculiar to Mauritius, and to be the only one of its group found in this island. If it be really a native of Madagascar, it will make the third species of this most beautiful and distinct section of the genus *Papilio* occurring there. The distribution of the group, which may be called the "*nireus*-group," after the best-known species belonging to it, shows how close is the relationship of the Madagascar fauna to those of the neighbouring islands and continental Africa—no near relative of any of the forms being found in other parts of the world. We are now acquainted with seven species comprised in it; these are—

(1) *P. charopus* (Westwood). Known only from the Gold Coast, Western Africa.

(2) *P. oribazus* (Boisd.). A near relative of *P. charopus*, peculiar to Madagascar.

(3) *P. nireus* (Linn.). Found commonly from Tropical Western Africa to Plettenberg Bay, near the Cape of Good Hope.

(4) *P. bromius* (Doubleday). Closely allied to *P. nireus*, and found only in Ashantee.

(5) *P. phorbanta* (Linn.). Known hitherto only from Mauritius.

(6) *P. epiphorbas* (Boisd.). Intermediate in many points between *P. phorbanta* and *P. disparilis*, and peculiar to Madagascar.

(7) *P. disparilis* (Boisd.). Distinguished by the great disparity in colour of the sexes, and known only from the Island of Bourbon.

It must be remarked that these species do not constitute a series of compact and independent forms; for they are very unequally related in their specific characters, and the chief member of the group, *P. nireus*, is subject to great local modification, so much so that four species have been made of it by different authors*.

2. TERIAS DESJARDINSII (♂), Boisd. Faun. Entom. de Madagascar, p. 22, pl. 2. f. 6.

Boisduval states that the female of this species is unknown. An example of this sex occurs in the present collection. It differs from the male in being a little larger and of a paler hue, with a broad dark-brown apical border to the fore wing, and the hind wing without border. Beneath, the only difference from the male is the presence of a reddish spot near the apex of the fore wing.

* The different forms of *P. nireus* constitute two species in G. R. Gray's 'List of Papilionidæ of the British Museum' (1856). The whole are reunited under one by the latest authority, Trimen, in his 'Rhopalocera Africæ Australis,' Cape Town, 1862.

3. Danais chrysippus, Linn.

A common and widely distributed insect, being found as far north as South-eastern Europe, and also over a great part of Tropical Asia.

4. Danais phædone, Fabricius.

This has hitherto been recorded only as inhabiting the Island of Mauritius. There is one example in the collection.

5. Euplœa euphone, Boisd. Faune Ent. de Madag. p. 36, pl. 3. f. 1.

Inhabits also Mauritius.

6. Acræa lycia, Godart.

An apparently common African insect, ranging from Sierra Leone to Natal.

7. Atella phalanta, Drury.

This species, which appears to be common in Madagascar, is one of the most widely distributed of insects, being found in all the warmer parts of Africa, as well as in Southern and Eastern Asia and the western islands of the Indian archipelago.

8. Hypanis anvatara, Boisd. Faune Ent. de Madag. p. 56, pl. 7. f. 5.

This can scarcely be considered anything more than a local variety of *H. polynice* of Tropical Africa, its difference from that species being very slight. As a local variety or race, however, it is peculiar to Madagascar.

9. Junonia rhadama, Boisd. Faune Ent. de Madag. p. 44, pl. 7. f. 2.

One of the most beautiful of the Madagascar Diurnal Lepidoptera, and formerly thought to be peculiar to the island; but it has since been found by Dr. Peters in Mozambique. The genus occurs in all quarters of the world except Europe, and is richly represented in Eastern and Southern Africa.

10. Diadema bolina, Linn.

There is one example of this common and widely distributed tropical insect in the collection. The species is said to occur at Cayenne, although the genus is otherwise unknown in the New World. If it really has been found there, it must have been accidentally introduced; for during my travels in the adjoining region of the Amazons I saw no trace of it; and it has never been found in the numerous collections received from other countries of Tropical America.

11. Neptis kikideli, Boisd. Faune Ent. de Madag. p. 50.

A species peculiar, as far as at present recorded, to Madagascar. The genus occurs, in numerous species, in all the warmer parts of the old continent.

12. CHARAXES CACUTHIS, Hewitson, Exot. Butt., Char. f. 12, 13.

This fine species has only recently been discovered in Madagascar, by Mr. F. Plant. There is a mutilated example in the collection. Its nearest relative, according to Mr. Hewitson, is *C. etheta* of Western Tropical Africa.

13. MYCALESIS NARCISSUS, Fabr.

A well-known South-African Butterfly. Found also in the island of Mauritius.

14. EREBIA TAMATAVÆ, Boisd. Faune Ent. de Madag. p. 60. pl. 8. f. 6, 7.

This, with *Erebia cassius*, and several other allied species inhabiting Southern Africa and the neighbouring islands differ considerably from the typical *Erebiæ* which are so abundant in the alpine districts of Europe and in high northern latitudes up to the Arctic circle. They will eventually, no doubt, be formed into a genus apart*. *Erebia tamatavæ* seems to be peculiar to Madagascar.

15. LYCÆNA BATIKELI, Boisd. Faune Ent. de Madag. p. 24, pl. 3. f. 5.

There is one mutilated example of this species in the collection.

16. ISMENE FORESTAN, Cramer.

Found also in Eastern Africa. The genus is widely distributed in the tropical parts of the Old World.

Order HOMOPTERA.

17. PLATYPLEURA, sp.

There are two examples of a *Cicada* of this genus, which have much resemblance to the common *Platypleura capensis* (Linn.) of the Cape of Good Hope.

Order COLEOPTERA.

18. GLYCIPHANA LUCTUOSA, Gory & Percheron, Mon. des Cét. t. 55. f. 5.

A Cetoniade, found also in Mauritius. The genus is common to all the warmer parts of the Old World.

19. ORYCTES PYRRHUS, Burmeister, Handbuch der Entom. v. p. 197.

There is a pair, male and female, of this insect in the collection: The species belongs to a section of the genus which has representatives in Mauritius, Java, Australia, and Europe.

* This has recently been done by Wallengren (Fregatten Eugenies Resa), who has proposed the name of *Pseudonympha* for the group.

20. POLYBOTHRIS COLLICIATA, Guérin-Méneville, Magasin de Zoologie, pl. 27.

A second species of this group, *P. auropicta*, was contained in the former collection sent by Mr. Caldwell. The group, formerly considered a genus, comprises fourteen species, all peculiar to Madagascar; it has been reunited by Lacordaire, the latest authority on the subject, to *Psiloptera*, a widely distributed genus, in consequence of the want of absolute structural characters to distinguish it; the species, however, may be considered as forming a good subgenus.

21. LACON VESTITUS, Klug, Ins. von Madag. p. 64.

Peculiar to Madagascar. The genus, however, is a cosmopolitan one.

22. MACROTOMA CORTICINA, Schönh. Syn. Ins. iii. p. 345, n. 54.

This species is also peculiar to Madagascar; but many closely allied species are known to inhabit the warmer parts of the Old World.

23. STELLOGNATHA MACULATA, Oliv. Entom. t. iv. p. 68, n. 87, pl. 7. f. 49 *a*, *b*, and f. 174 *a*, *b*.

Both species and genus of this large and striking Longicorn are peculiar to Madagascar. It belongs to the *Sternotominæ* group, which is peculiarly African.

Order ORTHOPTERA.

24. MANTIS MARGINATA, Fab. Ent. Syst. Suppl. p. 191. (*M. pustulata*, Stoll, f. 73; Serv. Hist. Nat. des Orthop. p. 186).

This is a common African insect, and is found also in Mauritius.

25. MANTIS CALDWELLII, n. sp.

♀. *Modice elongata, pallide viridis. Caput robustum, denticulo parvo utrinque inter basin antennæ et oculum. Prothorax latiusculus* (long. 7½ lin.), *supra coxas anticas paulo ampliatus, lateribus leviter denticulatis. Abdomen grossum, prothoraci longitudine æquale, supra rubro maculatum. Elytra abdomine paulo longiora, apice modice attenuata, costa arcuata, area costali tertiam partem latitudinis constituente; viridi-opaca, stigmate concolore; utrinque marginem posticam versus hyalina. Alæ hyalinæ, venis roseo tinctis, apicibus viridibus. Pedes simplices, modice elongati: coxis anticis supra multi-denticulatis, intus cum femoribus immaculatis.*

Long. 1″ 7‴—1″ 9‴.

This species, of which there are two female examples, has no very close relative at present known—the nearest approximation being the group of species allied to *M. unimaculata* of Stoll, natives of Eastern Africa.

26. Popa undata, Fabricius, Entom. Syst. ii. p. 19.

Theoclytes undata, Serville, Hist. Nat. des Orthop. p. 152.

Mantis undata, Charpentier, Orthop. Descr. et Dep. ♂ ♀, pl. 38.

Popa spurca, Stål, Öfversigt af Kongl. Vetenskaps Akademiens Förhandlingar, 1856, p. 169.

This remarkable *Mantis*, which, when its wings are closed, has a striking resemblance to a withered fragment of a tree-branch, is hitherto known only as an inhabitant of Southern Africa. The Madagascar specimen (a female) is about one-third larger than Natal examples; but the only difference, besides size, which I find is the greater breadth of the hyaline streaks accompanying the transverse veins of the wings.

27. Acridium ruficorne, Olivier, Encycl. Méthod. ix. p. 221. n. 25.

Found also at the Cape of Good Hope.

3. A List of the Birds inhabiting the Islands of Timor, Flores, and Lombock, with Descriptions of the New Species. By Alfred R. Wallace.

(Plate XXXIX.)

The chain of islands situated to the east of Java, and ending in Timor, forms a natural subdivision of the Malayan archipelago, being distinguished by peculiarities of physical geography as well as by a characteristic fauna. These islands all contain active volcanoes, and are for the most part of volcanic origin. Timor, however, which lies somewhat obliquely to the rest, consists in a great measure of ancient sedimentary rocks, which seem to have been exposed for long periods to volcanic convulsions, since they are everywhere shattered and distorted in a remarkable manner. All of these islands have a climate which differs from that of the rest of the archipelago in being remarkably dry; and this has produced a characteristic vegetation, in which spiny and prickly shrubs abound, while the dense luxuriant forests of the regions nearer the equator are quite unknown. The forest-trees of Timor are chiefly *Eucalypti* and Acacias, thinly scattered over bare and gravelly slopes; while it is only in the damper and more sheltered spots that patches of bush and thickets occur.

I visited Timor twice, and collected for nearly five months in both the eastern and western districts, obtaining 112 species of birds. Ill health and wars between the Portuguese and the natives prevented me from going far into the interior, where, especially on the south coast, I have reason to believe many additional species might have been obtained. Six other birds are said to be from Timor, mostly collected by the naturalists of the Dutch Government expeditions, making a total of 118 species from this island. My assistant, Mr. Allen, collected for nearly four months in the large island of Flores, and obtained eighty-six species of birds; and I am not aware that a



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J. Wolf, del. et lith.

M & N Hanhart imp.

PTILONOPUS ALBOCINCTUS.

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single species was previously known from this locality. From the next island, Sumbawa, I have obtained no collections. A few are indicated by Bonaparte as existing in the Leyden Museum, the whole of which, with one exception only (*Trichoglossus forsteni*), are found in the adjacent islands. In the next island, Lombock, I collected myself for two and a half months, obtaining sixty-three species of birds. The island of Bali commences the Indian region of zoology, which we have not now to consider; but I may mention that, according to the Dutch naturalist Zollinger, its fauna is absolutely identical with that of Java. The total number of species known to inhabit this group of islands is 186. Taking into consideration the comparative sizes of the islands, the above numbers may be supposed to represent with tolerable fairness their respective bird populations, and will therefore furnish us with materials for some interesting comparisons.

The Timorese subfauna, as we may conveniently name it, differs strikingly from the Moluccan in the absence of such genera as *Lorius*, *Eos*, *Eclectus*, and *Lycocorax*, and also of *Tanysiptera*, *Alcyone*, *Criniger*, and the subgenera *Iotreron* and *Cyanotreron*, all of which, though not peculiar to the Moluccas, are very characteristic of that group of islands. On the other hand, it shows a closer connexion with Australia than any other part of the archipelago, as evidenced by five genera, *Sphecothera*, *Gerygone*, *Pardalotus*, *Glycyphila*, and *Amadina*, which are found in this chain of islands, but do not pass into the Moluccas or Celebes. The number of species which appear to be restricted to the Timorese subfauna is eighty-one, many of which, however, are very slight modifications of Australian species. On the other hand, there is not a single genus confined to the group, or which can be said to have its metropolis in it—indicating that the fauna is strictly derivative, and of not very ancient date. In endeavouring to determine the origin of this fauna, we must eliminate those species and genera which, having a wide distribution and roaming habits, can give us little definite information. These are chiefly raptorial and aquatic birds, with a portion of the Passeres; and I find that fifty-seven species of this nature are identical with those of surrounding countries, while thirty-five more are representative species which cannot be referred to any one island rather than another for their probable origin. Deducting these ninety-two species, we have left a rather larger number of birds which we can trace directly either to Australia on the one side or to Java on the other.

The species which appear to be confined to each island may be classed as follows—

Lombock	4,	of which	1	genus is	Australian,	1	genus	Indian,
Flores	12,	„	5	genera are	„	2	genera	„
Timor	42,	„	16	„ „	„	4	„	„

showing that while there is a great preponderance of the forms of the Australian region in Timor, they decrease going westward, till in Lombock they are equalled by the Indian forms. The species which

are *identical* with those of Java or Australia show the proportionate influence of the two countries in a yet more striking manner.

	Lombock.	Flores.	Timor.
JAVAN.			
Species	32	22	10
Representatives....	1	3	5
	33	25	15
AUSTRALIAN.			
Species	4	5	10
Representatives....	3	9	26
	7	14	36

This table shows how two streams of immigration have entered the islands, the one from Java diminishing in intensity as it flowed on to Timor, the other from Australia diminishing in about the same degree towards Lombock. The total number of species which have entered on the two sides seems nearly equal, with only a slight preponderance in favour of Australia; but there is this remarkable difference, that whereas the great majority of the species derived from Java are identical with the present inhabitants of that island, those derived from Australia are for the most part representative species, less than half of them being identical with birds still living in that country. We shall see this perhaps more clearly by treating the islands as a whole, and dividing that portion of their birds which have exclusive relations to Java or Australia in a similar manner; thus the Timorese avifauna contains

Javan species.....	35	Australian species.....	13
Javan representatives..	11	Australian representatives..	35
	46		48

showing that, though the total number of species derived from the two districts is nearly the same, the identical species and representatives are divided in exactly reverse proportions. This fact is one of the most important that we can draw from a consideration of these lists of species, since it gives us a clue to the manner in which this little group of islands was first stocked with animal life, and, in connexion with geological considerations, will enable us to form a general idea of their early history.

Change of species is a slow process. On that we are all agreed, though we may differ about how it has taken place. The fact that the Australian species in these islands have mostly changed, while the Javan species have almost all remained unchanged, would therefore indicate that the district was first peopled from Australia. But, for this to have been the case, the physical conditions must have been very different from what they are now. Nearly 300 miles of open sea now separates Australia from Timor, which island is con-

nected with Java by a chain of broken land divided by straits which are nowhere more than about twenty miles wide. Evidently there are now great facilities for the natural productions of Java to spread over and occupy the whole of these islands, while those of Australia would find very great difficulty in getting across. To account for the present state of things, we should naturally suppose that Australia was once much more closely connected with Timor than it is at present; and that this was the case is rendered highly probable by the fact of a submarine bank extending along all the north and west coast of Australia, and at one place approaching within twenty miles of the coast of Timor. This indicates a recent subsidence of North Australia, which probably once extended as far as the edge of this bank. I do not think Timor was ever absolutely connected with Australia, because the representation of the forms of that country is not sufficiently perfect. There are no Kangaroos in Timor, nor indeed any Marsupials whatever, except a *Cuscus*, which is a Moluccan and not an Australian genus. Many highly characteristic genera of birds are also absent which we should certainly expect to find had the countries ever been connected, such as *Calyptorhynchus*, *Malurus*, *Cracticus*, *Anthochæra*, *Poëphila*, *Falcunculus*, *Colluricincla*, &c. Nor do any of the characteristic Australian groups of insects occur in Timor. Everything indicates therefore that a strait of the sea has always separated it from Australia—a supposition which is confirmed by the deep gulf that still runs between its rocky southern coast and the edge of the before-mentioned submarine bank.

But at the time when this narrowing of the sea took place in one direction, there must have been a greater separation at the other end of the chain, or we should find more equality in the numbers of identical and representative species derived from each extremity. It is true that the widening of the strait at the Australian end by subsidence would, by putting a stop to immigration and intercrossing of individuals from the mother country, have allowed the full action of the causes which have led to the modification of the species; while the continued stream of immigrants from Java would by continual intercrossing check such modification. This view will not, however, explain all the facts; for the character of the fauna of the Timorese group is indicated as well by the forms which are absent from it as by those which it contains, and is by this kind of evidence shown to be much more Australian than Indian. No less than twenty-nine genera, all more or less abundant in Java, and most of which range over a wide area, are quite absent; while of the equally diffused Australian genera only about fourteen are wanting. This would clearly indicate that there has been till recently a wide separation from Java; and the fact that the islands of Baly and Lombock are small and are almost wholly volcanic, and contain a smaller number of modified forms than the other islands, would point them out as of comparatively recent origin. Here probably existed a wide arm of the sea at the time when Timor was in the closest proximity to Australia; and as the subterranean fires were slowly piling up the now fertile islands of Bali and Lombock, the northern shores of

Australia would be sinking beneath the ocean. Some such changes as these will enable us to understand how it happens that, though the birds of these islands are on the whole almost as much Indian as Australian, yet the apparently endemic species have such a preponderating Australian character, and why such a very large number of characteristic Indian forms, which are common in Java and are known in most instances to extend into Bali, have yet never transmitted a single representative to the islands further east.

The following is a list of all the birds known to inhabit this group, with their distribution in the several islands. Those marked with an * are not known from any other localities. The descriptions of twenty-eight new species are afterwards given.

		Lombock.	Flores.	Timor.
1.	Baza reinwardtii, *Schl. & Müll.*	.....	.....	B. reinwardtii.
2.	Haliastur ponticerianus, *Gm.*	.....	H. ponticerianus ..	H. ponticerianus.
3.	Nisus virgatus, *Cuv.*	.....	.....	N. virgatus.
4.	Accipiter cruentus, *Gould*	.....	.....	A. cruentus.
5.	—— approximans, *Vig. & Horsf.*.....	A. approximans ..	A. approximans.	.....
6*.	—— sylvestris, *Wall.*	.....	A. sylvestris.	.....
7*.	—— n. sp. (*Gurney*), immature	A. ——, sp.	.....	.....
8.	Milvus affinis, *Gould*	.....	.....	M. affinis.
9.	Hypotriorchis frontatus, *Gould*	.....	H. frontatus.	.....
10.	Tinnunculus moluccensis, *H. & J.* ..	.....	T. moluccensis....	T. moluccensis.
11*.	Athene guteruhi, *Müll.*.....	.....	.....	A. guteruhi.
12*.	—— florensis, *Wall.*	.....	A. florensis.	.....
13.	Scops menadensis, var., *Q. & G.*	.....	S. menadensis.	.....
14*.	—— sylvicola, *Wall.*.....	.....	S. sylvicola.	.....
15.	Strix javanica, *Horsf.*	S. javanica.	.....	.....
16*.	Geoffroyus jukesii, *G. R. G.*?	.....	G. jukesii	G. jukesii.
17*.	Loriculus flosculus, *Wall.*.....	.....	L. flosculus.	.....
18*.	Aprosmictus vulneratus, *Wagl.*	.....	.....	A. vulneratus.
19*.	Trichoglossus hæmatodus, *L.*	.....	.....	T. hæmatodus.
20*.	—— euteles, *Temm.*	.....	T. euteles	T. euteles.
21*.	—— iris, *Temm.*	.....	.....	T. iris.
22*.	—— forsteni, *Bp.* (Sumbawa).	.....	.....	.....
23.	Cacatua sulphurea, *Gm.*	C. sulphurea	C. sulphurea	C. sulphurea.
24.	Halcyon collaris, *Sw.*	H. collaris	H. collaris	H. collaris.
25.	—— coronatus, *Müll.*	H. coronatus	.....	H. coronatus.
26.	—— sanctus, *Vig. & Horsf.*.....	H. sanctus.	.....	.....
27.	—— leucocephalus, *Gm.*	H. leucocephalus..	H. leucocephalus.	.....
28*.	—— fulgidus, *Gould*	H. fulgidus	H. fulgidus.	.....
29.	Alcedo moluccensis, *Bluth*	.....	A. moluccensis.	.....
30.	—— meningting, *Horsf.*	A. meningting.	.....	.....
31.	—— biru, *Horsf.*	A. biru.	.....	.....
32.	Ceyx rufidorsa, *Strick.*.....	C. rufidorsa	C. rufidorsa.	.....
33.	Caprimulgus macrourus, *Horsf.*	C. macrourus	.....	C. macrourus.
34.	Collocalia esculenta, *L.*	.....	.....	C. esculenta.
35.	—— fuciphaga, *Thunb.*	.....	.....	C. fuciphaga.
36.	Merops javanicus, *Horsf.*	.....	M. javanicus	M. javanicus.
37.	—— ornatus, *Lath.*	M. ornatus	M. ornatus.	.....
38.	Eurystomus pacificus, *Gm.*	E. pacificus	E. pacificus	E. pacificus.
39.	Cuculus canoroides, *Müll.*	.....	C. canoroides	C. canoroides.
40*.	—— lepidus, *Müll.*	.....	.....	C. lepidus.
41.	Cacomantis tymbonomus, *Müll.*	.....	.....	C. tymbonomus.
42.	Chrysococcyx chalcites, *Ill.*	C. chalcites	C. chalcites	C. chalcites.

	Lombock.	Flores.	Timor.
43. Eudynamis australis, *Sw.*	E. australis	E. australis	E. australis.
44. Centropus affinis, *Horsf.*	C. affinis	C. affinis	C. affinis.
45. Scythrops novæ-hollandiæ, *Reinw.*	.....	S. novæ-hollandiæ.	.....
46. Picus moluccensis, *Gm.*	P. moluccensis	P. moluccensis.	.....
47*. Pitta concinna, *Gould*	P. concinna	P. concinna.	.....
48*. —— irena, *Temm.*	.....	.....	P. irena.
49. Zoothera andromeda, *Temm.*	Z. andromeda.	.....	.....
50*. Drymocataphus bivittatus, *Bp.*	.....	.....	D. bivittatus.
51. Pycnonotus analis, *Horsf.*	P. analis.	.....	.....
52*. Oriolus broderipi, *Bp.*	O. broderipi	O. broderipi.	.....
53*. Mimeta viridifusca, *Cab.*	.....	.....	M. viridifusca.
54*. Sphecothera viridis, *Q. & G.*	.....	.....	S. viridis.
55. Parus cinereus, *Vieill.*	P. cinereus	P. cinereus.	.....
56. Mirafra javanica, *Horsf.*	.....	M. javanica.	.....
57*. Anthus medius, *Will.*	A. medius	.....	A. medius.
58. Motacilla flavescens, *Shaw*	.....	M. flavescens	M. flavescens.
59. Geocichla interpres, *Kuhl.*	G. interpres.	.....	.....
60*. —— rubiginosa, *Müll.*	.....	.....	G. rubiginosa.
61*. Turdus schlegelii, *Sclat.*	.....	.....	T. schlegelii.
62. Acrocephalus orientalis, *Bp.*	A. orientalis.	.....	.....
63*. Megalurus timoriensis, *Wall.*	.....	.....	M. timoriensis.
64*. Cisticola fuscicapilla, *Wall.*	.....	C. fuscicapilla	C. fuscicapilla.
65. —— ruficeps, *Gould*	C. ruficeps	C. ruficeps	C. ruficeps.
66. —— lineocapilla, *Gould*	C. lineocapilla.	.....	.....
67. Orthotomus sepium, *Horsf.*	O. sepium.	.....	.....
68. Sylvia flavescens, *G. R. G.*	.....	S. flavescens	S. flavescens.
69*. Gerygone sulphurea, *Wall.*	.....	G. sulphurea.	.....
70*. —— inornata, *Wall.*	.....	.....	G. inornata.
71. Pratincola caprata, *L.*	P. caprata	P. caprata	P. caprata.
72*. Saxicola dumetoria, *Wall.*	S. dumetoria.	.....	.....
73*. —— luctuosa, *Bp.*	.....	.....	S. luctuosa.
74*. —— pyrrhonota, *Bp.*	.....	.....	S. pyrrhonota.
75*. —— melanoleuca, *Bp.*	.....	.....	S. melanoleuca.
76. Muscipeta affinis, *Hay*, var.	.....	M. affinis, var.	.....
77. Myiagra cærulea, *Gm.*, var.	.....	M. cærulea.	.....
78*. —— rufigula, *Wall.*	.....	.....	M. rufigula.
79*. Micræca superciliosa, *Wall.*	.....	.....	M. superciliosa.
80*. Rhipidura diluta, *Wall.*	.....	R. diluta.	.....
81*. —— ochrogastra, *Müll.*	.....	.....	R. ochrogastra.
82*. —— semicollaris, *Müll.*	.....	.....	R. semicollaris.
83. Monarcha cinerascens, *Temm.*	.....	.....	M. cinerascens.
84. —— trivirgata, *Temm.*	.....	.....	M. trivirgata.
85. —— carinata, *Vig. & Horsf.*	.....	.....	M. carinata.
86*. Cyornis hyacinthina, *Temm.*	.....	.....	C. hyacinthina.
87. Hirundo javanica, *Sparrm.*	H. javanica	.....	H. javanica.
88. —— striolata, *Temm.*	.....	H. striolata.	.....
89. —— nigricans, *Vieill.*	.....	H. nigricans	H. nigricans.
90. Artamus leucogaster, *Val.*	A. leucogaster	A. leucogaster	A. leucogaster, var.
91*. —— perspicillatus, *Temm.*	.....	.....	A. perspicillatus.
92*. Dicrourus bimaënsis, *Wall.*	D. bimaënsis	D. bimaënsis.	.....
93*. —— densus, *Temm.*	.....	.....	D. densus.
94. —— cineraceus, *Horsf.*	D. cineraceus.	.....	.....
95*. Graucalus personatus, *Müll.*	.....	G. personatus	G. personatus.
96*. —— melanogenys, *H. & J.*	.....	.....	G. melanogenys.
97*. Campephaga plumbea. *Müll.*	.....	.....	C. plumbea.
98*. Lalage leucophæa, *Vieill.*	L. leucophæa	.....	L. leucophæa.
99*. —— nychthemera, *Bp.*	.....	.....	L. nychthemera.
100*. Pericrocotus exul, *Wall.*	P. exul.	.....	.....

	Lombock.	Flores.	Timor.
101. Pachycephala grisola, *Bl.*, var.	P. grisola.	.....	.....
102*. —— orpheus, *Jard.*	.....	.....	P. orpheus.
103*. —— calliope, *Müll.*	.....	.....	P. calliope.
104*. —— fulvotincta, *Wall.*	.....	P. fulvotincta.	.....
105*. Pardalotus obsoletus, *Müll.*	.....	P. obsoletus	P. obsoletus.
106. Lanius schah, *L.*	L. schah	.....	L. schah.
107. Corvus macrorhynchus, *Wagl.*	C. macrorhynchus .	C. macrorhynchus .	C. macrorhynchus.
108*. Tropidorhynchus timoriensis, *Müll.* .	T. timoriensis	T. timoriensis	T. timoriensis.
109*. —— cineraceus, *Temm.*	.....	.....	T. cineraceus.
110*. Ptilotis limbata, *Müll.*	P. limbata	P. limbata	P. limbata.
111*. —— virescens, *Wall.*	P. virescens.	.....	.....
112*. —— maculata, *Müll.*	.....	.....	P. maculata.
113*. —— reticulata, *Müll.*	.....	.....	P. reticulata.
114. Glycyphila ocularis, *Gould*	.....	.....	G. ocularis.
115*. Myzomela vulnerata, *Müll.*	.....	.....	M. vulnerata.
116. Zosterops intermedia, *Wall.*	Z. intermedia.	.....	.....
117*. —— aureifrons, *Wall.*	.....	Z. aureifrons.	.....
118*. —— citrinella, *Müll.*	.....	.....	Z. citrinella.
119*. Dicæum macklotti, *Müll.*	D. macklotti	.....	D. macklotti.
120*. —— igniferum, *Wall.*	.....	D. ignifer.	.....
121. Nectarinia pectoralis, *Horsf.*	N. pectoralis	N. pectoralis.	.....
122*. —— solaris, *Temm.*	.....	N. solaris	N. solaris.
123. Anthreptes lepida, *Lath.*	.....	A. lepida.	.....
124*. Calornis minor, *Bp.*	C. minor	C. minor	C. minor.
125*. Gracula venerata, *Bp.*	.....	G. venerata.	.....
126. Munia oryzivora, *L.*	M. oryzivora.	.....	.....
127*. —— pallida, *Wall.*	M. pallida	M. pallida.	.....
128*. —— quinticolor, *Vieill.*	M. quinticolor....	M. quinticolor....	M. quinticolor.
129. —— fuscata, *Vieill.*	.....	.....	M. fuscata.
130. —— ferruginea, *Sparrm.*	.....	M. ferruginea.	.....
131. —— punctularia, *L.*	M. punctularia ..	M. punctularia ..	M. punctularia.
132. —— molucca, *L.*	.....	M. molucca.	.....
133*. Amadina insularis, *Wall.*	.....	A. insularis	A. insularis.
134*. Estrelda flavidiventris, *Wall.*	.....	E. flavidiventris ..	E. flavidiventris.
135*. Erythrura tricolor, *Vieill.*	.....	.....	E. tricolor.
136*. Treron floris, *Wall.*	.....	T. floris.	.....
137*. —— psittacea, *Temm.*	.....	.....	T. psittacea.
138. Carpophaga ænea, *L.*	C. ænea	C. ænea.	.....
139. —— rosacea, *Temm.*	.....	C. rosacea.....	C. rosacea.
140*. —— cineracea, *Temm.*	.....	.....	C. cineracea.
141. Ptilonopus melanocephalus, *L.*	P. melanocephalus.	P. melanocephalus.	.....
142*. —— flavicollis, *Gray*	.....	.....	P. flavicollis.
143*. —— cinctus, *Temm.*	.....	.....	P. cinctus.
144*. —— albocinctus, *Wall.*	.....	P. albocinctus.	.....
145*. Ianthœnas metallica, *Temm.*	.....	.....	I. metallica.
146. Turtur tigrina, *Temm.*	T. tigrina	T. tigrina	T. tigrina.
147. —— bitorquata, *Temm.*	T. bitorquata	T. bitorquata	T. bitorquata.
148. Macropygia æmiliana, *Bp.*	M. æmiliana.	.....	.....
149*. —— magna, *Wall.*	.....	.....	M. magna.
150*. Turacœna modesta, *Temm.*	.....	.....	T. modesta.
151. Geopelia striata, *L.*	G. striata.	.....	.....
152*. —— maugei, *Temm.*	.....	G. maugei	G. maugei.
153. Chalcophaps javanica, *Gm.*	C. javanica	C. javanica.	.....
154*. Chalcophaps timoriensis, *Bp.*	.....	.....	C. timoriensis.
155. Gallus bankiva, *Temm.*	G. bankiva	.....	G. bankiva.
156. —— furcatus, *Temm.*	G. furcatus	G. furcatus.	.....
157*. Coturnix raaltenii, *Müll.*	.....	C. raaltenii	C. raaltenii.
158*. Hemipodius rufescens, *Wall.*	.....	.....	H. rufescens.

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		Lombock.	Flores.	Timor.
159.	Megapodius reinwardti, *Wagl.*	M. reinwardti	M. reinwardti.	.....
160.	Charadrius longipes, *Temm.*	.....	C. longipes	C. longipes.
161.	—— leschenaultii, *Pall.*	.....	C. leschenaultii.	.....
162.	Totanus hypoleucus, *Temm.*	.....	T. hypoleucus	T. hypoleucus.
163.	—— glareola, *Gm.*	.....	.....	T. glareola.
164.	Numenius uropygialis, *Gould*	.....	N. uropygialis.	.....
165.	Scolopax horsfieldi, *Gray*	.....	.....	S. horsfieldi.
166.	Himantopus leucocephalus, *Gould*	.....	.....	H. leucocephalus.
167.	Ardea typhon, *Temm.*	.....	A. typhon.	.....
168.	Egretta immaculata, *Gould*	.....	E. immaculata.	.....
169.	—— syrmatophora, *Gould*	.....	.....	E. syrmatophora.
170.	—— nigrirostris, *Gray*	.....	.....	E. nigrirostris.
171.	Herodias coromanda, *Bodd.*	.....	.....	H. coromanda.
172.	—— jugularis, *Blyth*	.....	.....	H. jugularis.
173.	—— novæ-hollandiæ, *Lath.*	.....	.....	H. novæ-hollandiæ.
174.	Butorides javanica, *Horsf.*	.....	B. javanica	B. javanica.
175.	Ardeola sinensis, *Gm.*	.....	A. sinensis.	.....
176.	Rallina phœnicura, *Temm.*	.....	.....	R. phœnicura.
177.	—— philippensis, *L.*	.....	.....	R. philippensis.
178.	Porzana quadristrigata, *Horsf.*	.....	.....	P. quadristrigata.
179.	Gallinula orientalis, *Horsf.*	G. orientalis.	.....	.....
180.	—— frontata, *Wall.*	.....	G. frontata.	.....
181.	Porphyrio smaragdinus, *Temm.*	.....	.....	P. smaragdinus.
182.	Anas gibbifrons, *Müll.*	.....	A. gibbifrons	A. gibbifrons.
183.	—— superciliosa, *Gould*	.....	.....	A. superciliosa.
184.	Dendrocygna vagans, *Eyton*	.....	.....	D. vagans.
185.	Podiceps tricolor, *G. R. G.*	.....	P. tricolor	P. tricolor.
186.	Graculus melanoleucus, *Vieill.*	.....	.....	G. melanoleucus.
		63 species.	86 species.	118 species.

Accipiter sylvestris.

Cinereus, capite pallidiore, gula pallide rufescente, pectore et abdomine rufis anguste albo fasciatis, alis subtus et tectricibus caudæ inferioribus albescentibus, rectricibus ad basin albis plus minusve nigro fasciatis.

Ashy above, rufous beneath, narrowly banded with whitish; wings white on the under surface, except the ends of the quills; tail white at the base, and the feathers towards the centre with eight or nine blackish bands. This bird resembles *A. iogaster* in wanting the rufous collar, but is much smaller and paler-coloured; it is also like *A. cruentus* in its banded under surface, but, though smaller, has a larger bill than that species. Bill black; cere and legs yellow.

♂. Total length 12½ inches; wings 7 inches; tail 5½ inches.

♀. Total length 13¾ inches; wing 8 inches; tail 6¼ inches.

Hab. Flores.

Scops silvicola.

Rufo-fuscus, plumis nigro lineatis et maculatis; tectricibus alarum albo marginatis; remigibus fuscis, fasciis plurimis externe pallide rufis, interne obsoletis; cauda obscura, rufo irrorata, fasciis decem rufis; tarsis dense vestitis, digitis nudis.

Pale dusky rufous, the feathers irrorated with dusky and with a median dark line; greater and middle wing-coverts white-tipped; quills dusky, with obsolete paler bands, on the outer web with pale rufous bands; tail with about ten narrow rufous bands, which are dusky-margined; facial setæ very long; tarsi densely feathered; toes naked.

Total length 12 inches; wing $8\frac{1}{2}$ inches; tail $4\frac{1}{2}$ inches; bill, from gape, $1\frac{1}{10}$ inch.

Hab. Flores.

Remark.—The only specimen obtained was immature; but it seems very distinct from all other Malayan species.

ATHENE FLORENSIS.

Fusco-brunnea, subtus alba, brunneo maculato-striata; fronte gulaque albescentibus; cauda fasciis quinque obscurioribus, rectricibus albo terminatis.

Darker and much larger than the other Malayan forms of *Athene hirsuta*.

Total length $12\frac{3}{4}$ inches; wing $9\frac{1}{4}$ inches; tail $5\frac{1}{4}$ inches; tarsus and mid toe, without claw, $2\frac{1}{4}$ inches; bill, from gape, 1 inch.

Hab. Flores.

LORICULUS FLOSCULUS.

Viridis, dorso obscuriore; macula gulari, uropygio tectricibusque caudæ superioribus coccineis; macula nuchali fulvescente; alis caudaque subtus glauco-viridibus, rectricibus flavo terminatis.

Green, above darker; middle of the body beneath with a yellowish tinge; nape fulvous orange; elongate spot on throat red, rump and upper tail-coverts crimson; tail above dark green tipped with yellow and red; quills and tail-feathers beneath margined with verditer-blue; bill red; feet orange-red.

Total length $4\frac{3}{4}$ inches; wing 3 inches.

Hab. Flores.

Remarks.—This pretty little bird is allied to the *L. pusillus* of Java and *L. indicus* of Ceylon; but also approaches in coloration to *L. galgulus* and others of the black-billed group. A single specimen only was obtained.

ANTHUS MEDIUS.

A. australi *similis, sed minor, ungue postico magis curvato: similis* A. malayano, *sed rostro breviore, pectoris striis majoribus, ungue postico breviore et magis curvato.*

Dusky or blackish above; the feathers margined with ochreish yellow or ashy, beneath white or yellowish; the breast and a line from each angle of the mouth dusky-spotted; a yellowish line above the eye; tail dusky, outer feather white, except the base, the next dusky on the inner margin; bill blackish horn, beneath yellowish; feet very pale; iris dark.

Total length 6¾ inches; wing 3⅛ inches; tail 2½ inches; bill, to front, $\frac{7}{12}$ inch.

Hab. Timor and Lombock.

DRYMOCATAPHUS BIVITTATUS, Bp. (Consp. Gen. Av. p. 359).

Olivaceo-brunneus, subtus pallide rufescens, capite saturatiore, uropygio caudaque rufo-castaneis, vitta supra oculos pallide rufa, alis ventre et lateribus fuscis, tectricibus caudæ inferioribus rufis.

Above olive-brown, on head chestnut-tinged, on rump and tail deep chestnut-brown, a stripe over the eye widening to the nape pale rufous; beneath rufescent; wings and flanks dusky; belly paler; under tail-coverts rufous; bill dark olive, pale beneath; iris dark; feet pale olive.

Total length 7¼ inches; wing 2½ inches; tail 3¼ inches; bill, to gape, $\frac{7}{8}$ inch.

Hab. Timor.

Remarks.—The sexes are alike. This bird is closely allied to the *Myiothera capistrata*, Temm.; but differs in its coloration, and in having a much longer tail. I had described it as a new species, but have now little doubt that it is the bird briefly characterized by Bonaparte as *Napothera bivittata*.

MEGALURUS TIMORIENSIS.

Similis M. galactodi (Temm.), *sed major et cauda immaculata.*

Above rusty rufous; the feathers of the back, tertiaries, and greater wing-coverts having dark centres and dusky yellowish margins; beneath whitish; throat pure white; sides of the neck and breast of an ashy tinge, which becomes a pale brown on the flanks and under tail-coverts; a pale streak from the nostrils above the eye; under wing-coverts rufous-tinged; bill bluish, pale below, and blackish on the culmen; feet pale olive.

Total length 9 inches; wing 1$\frac{7}{10}$ inch; bill, to front, ½ inch; tarsus 1 inch; mid toe and claw 1 inch.

Hab. Timor.

Remarks.—The sexes are alike. This bird carries its tail much elevated. It seems to be a large and slightly modified race of the Australian *M. galactodes*.

CISTICOLA FUSCICAPILLA.

Supra rufo-brunnea, subtus alba dilute fulvo tincta; dorso alisque fuscis, plumis pallide marginatis; uropygio rufescente; rectricibus fuscis medialiter rufo maculatis, versus apicem nigro fasciatis, et albo terminatis.

Above dusky brown; back and wings dusky, with the feathers brown-margined; wing-coverts and quills margined with light brown; beneath white, very faintly buff-tinged; rump and flanks buffy; tail dusky, all the lateral feathers with a rufous band beyond the middle,

more distinct on the inner web, beyond this a subterminal black band and white apex; under wing-coverts white; bill pale yellowish, dusky above; feet pale reddish.

Total length 4 inches; wing 2 inches; bill, to gape, $\frac{1}{2}$ inch.

Hab. Timor; Flores.

Remark.—This species is near *C. ruficeps*, Gould, but differs in the dark head and peculiar markings of the tail.

SAXICOLA (?) DUMETORIA.

Nigra; gula et pectore rufis; abdomine et tectricibus caudæ inferioribus albis; fascia longitudinali alarum et linea elongata supra-oculari albis; rectricibus dimidio basali albo, duabus mediis exceptis nigris.

Shining black; throat and breast light rufous, remaining under parts white; chin whitish, a line from above the nostrils over the eye to the back of the head white; tips of the middle wing-coverts and the outer web of the third tertiary white, forming a white longitudinal band across the wing; two middle tail-feathers all black, the next two black-edged at the base, and the rest with the basal half entirely white; bill black; feet pale.

Total length $5\frac{1}{8}$ inches; wing $2\frac{7}{2}$ inches; tail $1\frac{9}{10}$ inch; bill, from gape, $\frac{6}{10}$ inch.

Hab. Lombock.

Remark.—The genus to which this bird belongs is doubtful. It is, however, congeneric with *Saxicola pyrrhonota*, Müll., from Timor.

GERYGONE INORNATA.

Supra pallide fusca, subtus alba; alis fuscis, remigibus albo lituratis; cauda fusca, basi albescente, versus apicem nigra, rectricibus albo terminatis, duabus externis macula apicali fusca.

Above pale earthy brown; beneath white; quills dusky, white-edged; tail dusky, whitish at the base, toward the end black, each feather terminated with a white spot, which on the two outer ones is larger and bears a dusky spot at the apex; bill and feet black; iris red. The sexes are alike.

Total length 4 inches; wing 2 inches; tail $1\frac{3}{4}$ inch; bill, to front, $\frac{1}{3}$ inch.

Hab. Timor.

GERYGONE SULPHUREA.

Supra dilute olivaceo-cinerea, subtus sulphurea; remigibus fuscis pallide marginatis; rectricibus fascia subterminali nigra, in pogonio interno albo terminata.

Pale ashy, with a faint olive tinge; beneath pure sulphur-yellow, becoming whitish on the under tail-coverts; quills dusky, with an outer pale edge and whitish inner margin; tail with a subterminal blackish band, beyond which is a white spot on the inner web; bill broad, black; feet dusky plumbeous.

Total length $3\frac{2}{3}$ inches; wing $1\frac{7}{8}$ inch; tail $1\frac{4}{10}$; bill, to front, $\frac{1}{3}$ inch.

Hab. Solor Island.

GERYGONE SUPERCILIOSA.

Olivaceo-viridis, subtus albo-flavescens; capite obscuriore, genis et linea superciliari albescentibus; cauda fusca, viridi marginata, rectricibus utrinque tribus pogonio interno albo.

Olivaceous; head dusky; beneath yellow-white; throat whitish, yellow-dashed; a whitish line over the eye from the nostrils to the nape; quills dusky, olive-margined; tail dusky, the middle feathers olive-margined, the outer three on each side white, narrowly margined with dusky and an olive edge; bill dusky, beneath yellowish; feet lead-colour.

Total length $4\frac{1}{4}$ inches; wing $2\frac{1}{8}$ inches; tail $1\frac{3}{4}$ inch; bill, to front, $\frac{4}{10}$ inch.

Hab. Timor.

MYIAGRA RUFIGULA.

Cyaneo-plumbea; capite cyaneo-chalybeo; gula et pectore intense rufo-castaneis, abdomine albo; cauda fusco-nigra, rectricibus duabus extimis externe albo marginatis.

Lead-blue; head steel-blue; throat and breast vivid chestnut-red; belly and under tail-coverts white; quills blackish, very narrowly bluish-margined towards the base; under wing-coverts white, and quills white-margined towards the base beneath; tail blackish, the outer margin of the two outer feathers and the extreme tips of the next pair whitish; bill lead-blue, tip and culmen black; iris dark; feet black.

Total length 6 inches; wing $2\frac{3}{4}$ inches; bill, from front, $\frac{1}{2}$ inch, width $\frac{3}{10}$ inch.

Hab. Timor.

Remark.—This species differs from *M. latirostris*, Gould, in its smaller size, more deeply coloured throat, and the white margin to the outer tail-feathers.

RHIPIDURA DILUTA.

Fusca; fronte caudaque fusco-nigra; gula et macula utrinque ante oculos albis, pectore rufo-fusco; abdomine tectricibusque caudæ inferioribus dilute rufis, rectricibus duabus utrinque et apice tertiæ albo-ochraceis.

Dusky brown; forehead and tail blackish; throat and a small frontal eye-mark white; breast rufous ashy, rest beneath pale rufous; two outer tail-feathers and the outer and apical portion of the third ochreish white; quills dusky, narrowly margined with bright rufous; bill black, base of lower mandible and basal half of its vibrissæ pale; iris dark; feet dusky.

Total length $6\frac{1}{2}$ inches; wing 3 inches; tail $3\frac{1}{4}$ inches.

Hab. Flores.

Remark.—Near to *R. assimilis*, G. R. Gray, but may be at once distinguished from all the other species of the genus by the uniform pale colour of the outer tail-feathers.

PACHYCEPHALA FULVOTINCTA.

Supra flavo-olivacea, subtus cum cervice lutea, pectore fulvo tincta; capite et torque lato gulari nigris, gula alba, cauda cum tectricibus superioribus nigris.

Above olive-yellow; beneath yellow; head and a band across the throat black; chin and throat white; upper part of breast rich fulvous yellow; a yellow collar round the nape, brightest on the sides of the neck; quills dusky, olive-margined; upper tail-coverts and tail black, feathers narrowly tipped with olive.

♀. Above dusky olivaceous; crown ashy; rump and tail yellowish; quills dusky, margined with brown, the tertiaries with rufous; beneath, cheeks and breast rufescent; chin whitish; lower breast and belly nearly pure white; under tail-coverts pale yellow; bill black; feet dusky.

Total length 6 inches; wing 3 inches; tail $2\frac{1}{3}$ inches.

Hab. Flores.

DICRURUS BIMAËNSIS.

Edolius bimaënsis, Temm. MSS. (Bp. Consp. p. 352).

Nigro-cæruleus; alis caudaque æneo-viridibus, metallicis; pectore maculis elongatis metallicis; caudæ rectricibus externis valde recurvatis.

Blue-black; wings and tail brilliant metallic brassy green; elongate spots on the breast and the tips of the feathers of the crown of the same colour; the outer tail-feathers strongly curved upwards; frontal feathers much elongated and depressed; bill and feet black; iris red.

Total length 11 inches; wing $5\frac{1}{4}$ inches; tail 5 inches; bill, from gape, 1·4 inch.

Hab. Lombock, Sumbawa (*Temm.*), and Flores.

Remark.—The name above quoted has no description attached to it in Bonaparte's 'Conspectus;' but I have adopted it for this bird, which is no doubt the same species.

PERICROCOTUS EXUL.

Nigro-cæruleus; pectore, ventre, uropygio, fascia alarum et rectricibus lateralibus vivide aurantiacis, rectricibus duabus mediis nigris, duabus sequentibus dimidio apicali aurantiaco.

♀. *Coloribus cinereis et flavis similiter dispositis, et fronte flavescente.*

Blue-black; breast, belly, rump, upper and under tail-coverts, margin of shoulder, wing-band, and outer tail-feathers rich orange; the wing has a band from the fourth primary, narrowing on the secondaries, and suddenly broader on the tertiaries, and two of the

tertiaries have an orange spot near the tip; the tail has the two middle feathers entirely black, the next two with half the outer and one-third the inner web orange, the rest orange with a decreasing quantity of black at their bases. The female is dusky ash; the wings and tail blackish, with a bright yellow taking the place of the orange in the male; the forehead is yellow-tinged, and the quills are more or less margined and tipped with yellow; bill and feet black; iris dark.

Total length 7½ inches; wing 3¼ inches; tail 3⅝ inches; bill, to front, ½ inch.

Hab. Lombock.

Remark.—This elegant species differs from *P. flammeus*, Temm., in its larger size, orange colour, and rather different markings of the wings and tail.

ZOSTEROPS INTERMEDIA.

Flavo-virescens, subtus flava; fronte flavescente, tænia nigra sub oculis; remigibus rectricibusque fuscis, flavo-viridi marginatis.

Very near *Z. flava*, but a little larger, more yellow on the forehead and less on the upper tail-coverts, and the black subocular streak not extending so far forward; iris olive-brown; feet dusky lead; upper mandible dark, lower pale.

Total length 4½ to 4¾ inches; wing 2⅛ inches; bill, to gape, $\frac{6}{10}$ inch.

Hab. Macassar and Lombock.

Remark.—Mr. G. R. Gray attached the MS. name of *intermedius* to my Macassar specimen.

ZOSTEROPS AUREIFRONS.

Flavo-virescens, subtus alba, lateribus albo-cinereis; facie, gula, uropygio et crisso vivide flavis; frontis plumis densis, suberectis, aureo-fulvis.

Greenish yellow; head yellower; forehead golden orange; face, throat, rump, and under tail-coverts pure yellow; beneath the body white, with the sides ashy; wings and tail dusky, feathers margined with olive-yellow; iris dark; bill dusky lead; feet pale lead-colour.

Total length 4¼ inches; wing 2⅛ inches.

Hab. Flores.

I give here descriptions of two other species of *Zosterops* which appear new:—

ZOSTEROPS ATRIFRONS.

Flavo-virescens, capite obscuriore, fronte nigra, pectore cinereo-albo, abdomine albo, tectricibus caudæ inferioribus flavis, cauda fusco-nigra.

Greenish yellow; top of head dusky, shading into deep black on the forehead and the space in front of the eye; breast ashy white;

belly white; under tail-coverts yellow; tail dusky black; quills dusky, yellow-margined; bill black, base beneath lead-colour; feet pale bluish olive; iris olive-brown.

Total length $4\frac{1}{2}$ inches; wing $2\frac{1}{10}$ inches; bill, to front, $\frac{3}{8}$ inch.

Hab. Menado (North Celebes).

ZOSTEROPS GRAYI.

"*Z. citrinella*, Müll.," G. R. Gray, P. Z. S. 1858, p. 175.

Flavo-viridis, subtus albescens; capite fuscescente; fronte, gula, uropygio et crisso flavis; remigibus rectricibusque fuscis, flavo-marginatis.

Much larger than *Z. citrinella* from Timor. Crown of head darker; wings and rump yellower; bill black; pale at base of lower mandible; feet pale lead-colour. The comparative dimensions of the two species are as follows:—

	Total length.	Wing.	Tail.	Bill.	Tarsus.
Z. grayi.....	5 in.	$2\frac{1}{2}$ in.	2 in.	$\frac{5}{10}$ in.	$\frac{8}{10}$ in.
Z. citrinella ..	$4\frac{1}{4}$ in.	$2\frac{1}{8}$ in.	$1\frac{6}{10}$ in.	$\frac{4}{10}$ in.	$\frac{6}{10}$ in.

Hab. Ké Island.

Remark.—I have named this bird after Mr. George Robert Gray, from whose writings and personal information I have derived much assistance.

DICÆUM IGNIFERUM.

Supra nigro-cyaneum; capite, collo, dorso medio et uropygio rubris; facie, colli lateribus et pectoris linea mediana fusco-nigris; mento, pectore inferiore et abdomine albis; gula rubra.

Above blue-black; top of the head and the middle line of the back to the upper tail-coverts blood-red; sides of the neck and upper part of the breast dusky black; chin white; throat red, in a broad longitudinal stripe; rest of the underside white, the black of the breast being continued in a stripe down to the belly; bill and feet black.

The females or young males are more dusky above, with the red on the head and rump, but less distinct on the back; beneath white, with the face and breast dusky ash.

Total length $3\frac{1}{2}$ inches; wing 2 inches.

Hab. Flores.

Remark.—This species resembles *D. cruentatum* above, and *D. macklotti* beneath.

PTILOTIS VIRESCENS.

Flavo-virescens, subtus pallidior; gula cinerea, abdomine crissoque albescentibus.

Yellowish green; feathers of crown dusky, greenish-margined; throat ashy; breast pale yellowish green; belly and vent whitish;

quills and tail-feathers dusky, margined with olive-green; under wing-coverts and inner margins of quills white; iris dark; bill black; feet lead-colour.

Total length $5\frac{3}{4}$ inches; wing $2\frac{3}{8}$ inches; bill, from front, $\frac{4}{5}$ inch.

Hab. Lombock.

MUNIA PALLIDA.

Rufo-cinerea, subtus pallide rufa; capite colloque albis, pectore albescente, crisso caudaque rufo-castaneis, uropygio et caudæ tectricibus superioribus intense sericeo-castaneis.

Above rufous ash; beneath pale rufous; head and neck white; breast tinged with rosy ash; tail and under tail-coverts dark rufous; rump and upper tail-coverts glossy chestnut-brown; bill and feet blue-lead; iris dark.

Total length $4\frac{1}{8}$ inches; wing $2\frac{1}{5}$ inches.

Hab. Lombock and Flores.

Remarks.—Very near *Munia maja*, L., but differs in the much paler colouring of both upper and under surface.

AMADINA INSULARIS.

Fusco-cinerea, subtus albida; gula et pectoris lateribus cinereis, macula pectorali nigra undulata; macula magna auriculari, antice nigro marginata, rufa; lateribus castaneis albo guttatis; crisso albo et nigro variegato; tectricibus caudæ superioribus valde elongatis, nigris, albo maculatis, subfasciatis.

Very near *Amadina castanotis*, Gould, from Australia, from which it differs principally in the chin and throat not being banded. The female wants the rufous and black markings on the ear-coverts, flanks, and breast; iris reddish brown; bill coral-red; feet reddish white.

Total length 4 inches; wing 2 inches.

Hab. Timor and Flores.

ESTRELDA FLAVIDIVENTRIS.

Similis E. puniceæ *ex Java, sed ventre dilute rubro-flavescente, tectricibus caudæ inferioribus nigris albo et rubido maculatis, rectricibus albo terminatis.*

Ashy brown; head and back red-tinged; face, throat, breast, and rump deep red; lower breast, belly, and vent yellow, washed with red; wing-coverts, tertiaries, sides of breast, and flanks with numerous round white spots; under tail-coverts black, with more or less white at the base and apex of each feather, and sometimes tinged with red; the four outer tail-feathers on each side rather broadly white-tipped; bill blood-red; feet very pale reddish; iris red.

Total length 4 inches; wing $1\frac{3}{4}$ inch; tail $1\frac{3}{8}$ inch; bill, to front, $\frac{3}{8}$ inch.

Hab. Timor and Flores.

Remarks.—In some specimens the white spots spread over the

whole neck and breast. The species is most readily distinguished from *E. punicea* by the reddish-yellow belly. It is rather abundant in the grassy valleys of Timor.

TRERON FLORIS.

Flavo-viridis; dorso fusco, interscapilio cinereo tincto; pileo plumbeo, fronte albescente; alis nigris, remigibus secundariis et tectricibusque alarum pallide flavo marginatis; rectricibus lateralibus cinereis medialiter nigro fasciatis; femoribus tectricibusque caudæ inferioribus albo et viridi maculatis.

♀. *Dorso fusco-virescente, minime cinereo.*

Beneath pale yellow-green; top of head lead-colour; forehead, chin, and gape whitish; upper part of back ashy green; the rest, upper wing-coverts, and tertiaries dusky green; rump and upper tail-coverts bright yellow-green, as well as the four middle tail-feathers; lateral tail-feathers with the basal half dusky ash, a median black spot or band, and the apical portion whitish ash; tail beneath black, broadly tipped with ashy white; under tail-coverts green, broadly margined and tipped with white, as are also the thighs and lower part of the belly; quills black, the primaries finely white-edged, the secondaries and greater and middle coverts rather narrowly bordered with pale yellow; bend of wing ashy purple; underside of wing entirely slate-colour; bill with the tip yellowish; orbits bare; feet red, as in *Treron griseicauda*.

Total length 11½ inches; wing 6 inches.

Hab. Flores and Solor Islands.

Remarks.—The sexes are alike, the female only differing in the rather duskier back and more green-spotted under tail-coverts. In the form of the bill and frontal feathers this species agrees with *T. nepalensis* and *T. griseicauda*, and in coloration can hardly be distinguished from the female of the latter species. It is singular that in the Island of Timor an allied species (*T. psittacea*, Temm.) should be found which also wants the chestnut-coloured back in the male, the habitats of both agreeing closely in their peculiar climate and vegetation.

PTILONOPUS ALBOCINCTUS. (Pl. XXXIX.)

Æneo-niger; collo latissime pectoreque cæsiis; capite albescente; gula, torque pectorali et tænia dorsali albis; ventre et femoribus flavo-olivaceis, tibiis cinereis; tectricibus caudæ inferioribus cinereis late flavo marginatis, cauda fascia terminali cinerea.

Bronzy black; crown and forehead ashy white; throat and cheeks white; neck and breast bluish ash, with a narrow edging above and a broad band beneath white; below this a broad blue-black band on the lower breast; belly and thighs olive-yellow; legs ashy; under tail-coverts ashy with broad margins to the feathers bright yellow; tail with a terminal ash-coloured band, which on the underside is nearly white; bill greenish at base, yellow at tip; feet bright red.

Total length 12½ inches; wing 6 inches (the first quill moderately attenuated at the tip); tail 4¾ inches.

Hab. Flores (in the interior only).

Remarks.—This fine new species is closely allied to *Columba cincta*, Temm., of the adjacent island of Timor, differing principally in the delicate bluish colour of the neck and breast, and structurally in the form of the first primary, which in *P. cinctus* is much more abruptly acuminated. A single specimen only was obtained.

TURNIX RUFESCENS.

Supra fuscus, subtus rufescens; plumis dorsi nigro maculatis et luteo-rufo marginatis, tectricibus alarum fulvo terminatis et nigro maculatis aut lunulatis; pectore rufo, lateribus nigro lunulatis; pectore et abdomine medio albescentibus; alis fusco cinereis, prima remigum fulvo marginata.

Above dusky; feathers irregularly black-marked, on the back margined with pale rufous; beneath rufescent; throat and middle of the belly whitish; breast bright rufous, towards the side with black lunules; flanks with broad blackish bands; wing-coverts with fulvous tips, with rounded black spots and lunules; quills dusky, the first yellow-margined; the tertiaries mottled on the margins with rufous and black; bill dusky, yellow at base; feet pale yellow; iris dark.

Total length 5 inches; wing 3 inches; bill, to gape, $\frac{6}{10}$ inch; mid toe and claw $\frac{7}{10}$ inch.

Hab. Samao Island (Timor).

MACROPYGIA MAGNA.

Fusco-brunnea, nigro et rufo undulata; cauda pallidiore, unicolore; pileo rufo; subtus dilute brunnea, fusco et albo undulata, tectricibus alarum inferioribus et remigum marginibus rufo-castaneis; tectricibus caudæ inferioribus rufis, ad basin fusco undulatis; rectricibus duabus exterioribus utrinque in margine interiore macula elongata schistacea.

Dusky brown, banded with blackish and rufous; tail uniform pale earthy brown; top of head rufous: beneath light ochre-brown, banded with whitish and dusky at the end of each feather; quills blackish, with a narrow white edge; entire base of the wings beneath chestnut-brown, which extends on to the inner margins of the primaries; under tail-coverts rufous, slightly banded at the base; tail-feathers rufescent towards the base, the two outer feathers on each side with an elongate slate-coloured spot on the inner margin; bill blackish; feet pale pink-red.

Total length 17 inches; wing 7½ inches; tail 8½ inches; bill, to front, $\frac{7}{10}$ inch.

Hab. Timor.

4. On some new Australian Species of Crustacea. By C. Spence Bate, F.R.S., F.L.S., etc.

(Plates XL. and XLI.)

The following species of Crustacea were collected and sent to the British Museum by Mr. Angas, who obtained them during his sojourn in Australia. *Angasia pavonina* is figured from a coloured drawing taken of the animal, while living, by Mr. Angas; the others are from preserved specimens by the author.

Angasia, White.

Hippolyte *similis, sed rostrum sine carina dorsali, et sine appendice ad mandibulam.*

Like *Hippolyte*, except that the dorsal surface of the carapace is horizontally continuous on the rostrum, and gradually converges laterally to a point, and the mandibles are without any secondary appendage.

This genus was founded by Mr. Adam White, and orally described by him at a Meeting of the Zoological Society, for the purpose of receiving a very pretty species that was brought from Australia by Mr. Angas.

The arrangement in this memoir differs from that of Mr. White in making the form a genus instead of a subgenus. This I do, first, because a subgenus appears to be both an inconvenient and an unnatural arrangement; and second, because whenever there is any structural distinction, however unimportant it may appear to be to our cognizance, yet it is impossible to classify such a species together in a genus with others not possessing the same structure. For quick detection, no doubt variation in form may be more appreciable for observation than an alteration of structure; but it stands to reason that the latter, however small, must be far more important in the economy of the animal's life than the former. It must also be taken into consideration that we seldom find any structural alteration, however small, without perceiving a more or less important variation in the condition of some other part of the same animal.

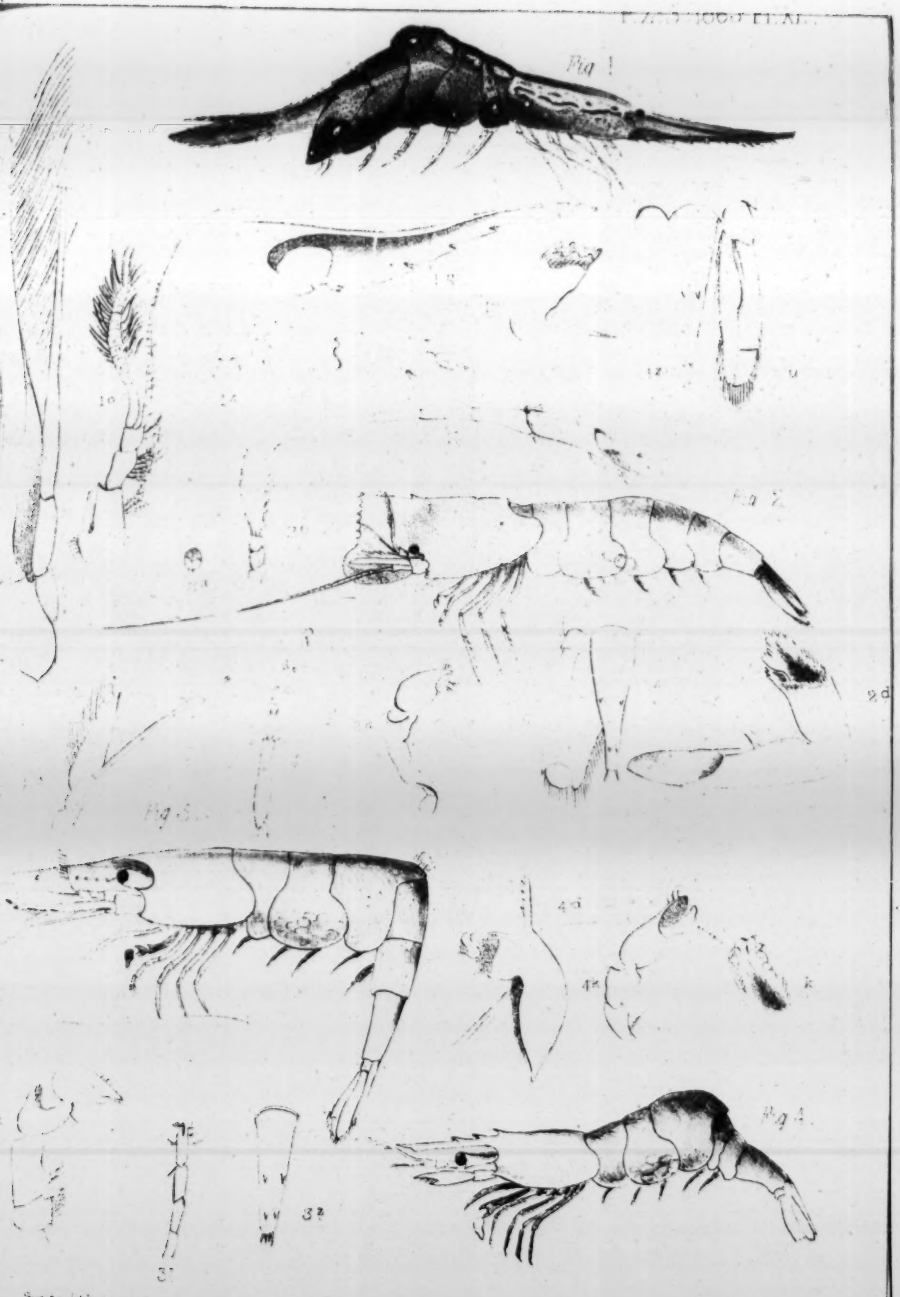
This genus is closely allied to *Hippolyte*, from which the most palpable distinction exists in the absence of the carinated ridge that traverses the rostrum and the dorsal surface of the carapace, and in the more important feature of the absence of the apparently insignificant appendages attached to the mandible.

Angasia pavonina. (Pl. XL. fig. 1.)

A. *rostro tam longo quam carapax, et antenna inferiore tam longa quam pars dimidia pleontis sui.*

Length $2\frac{1}{2}$ inches.

This, the only species that has been found, has the rostrum quite as far projecting in advance of the eye as the carapace extends posteriorly to it, with a deep carina upon the inferior surface, having the margin furnished with four small teeth. The eye is elevated upon a

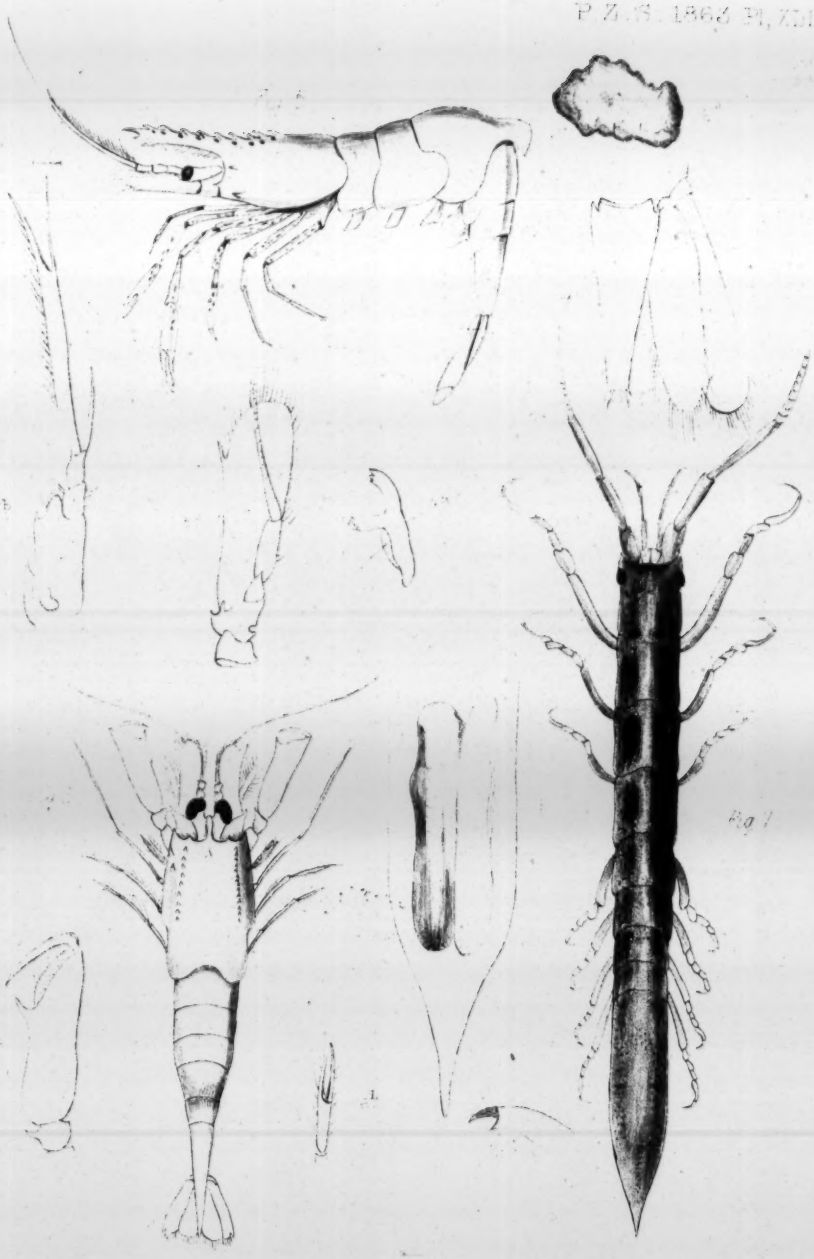


Smith ith del. et lith.

M & N Hanhart imp.

NEW AUSTRALIAN CRUSTACEANS

BRITISH
3 AU 63
MUSEUM



Smith, Elder & Co. imp.

M & N. Hanhart. lith.

NEW AUSTRALIAN CRUSTACEANS.

BRITISH
3 AU 60
MUSEUM

long peduncle. The superior antenna is short, the extremity of the flagella reaching scarcely more than half the length of the rostrum, and scarcely longer than the peduncle, the first joint of which is armed with a tooth as long as the joint. The inferior antenna has the squamiform appendage reaching nearly to the extremity of the rostrum, and the flagellum reaching more than the length of the rostrum beyond it. The mandible differs from that of *Hippolyte* in the absence of the small secondary appendages, and in having the molar surface more denticulated and less furnished with hairs. The second pair of gnathopoda are flat or spatuliform, fringed at the apex with eight or nine robust teeth. The first pair of pereiopoda are short, robust, and chelate, having the propodos longer than the carpus. The second pair are long, slender, and chelate, having the propodos shorter than the carpus. The remaining three pairs of pereiopoda are shorter than the second, and slightly more robust, and terminate in simple unguiculate dactyli; the inner surface of the carpi and propodi are armed with spines, those on the carpi being all equally long and strong, while those on the propodi gradually increase in length towards the distal extremity. The pleon has the lateral walls of the first five segments deeply produced, those of the fifth being quite as deep again as the body. The posterior pair of pleopoda are rather longer than the telson, and fringed with cilia, except upon the outer margin of the outer ramus. Telson longer than the last segment of the pleon, terminating in an obtuse point, and armed near the central and terminal margins with two pairs of short spines.

Mr. Angas, who took this very beautifully coloured species, describes it as of a "rich green, between apple and malachite, darker on the back, chrome-yellow and gamboge nose and lines along the back, then cobalt-blue, the rostrum being tipped with crimson. The eye-like spots upon the sides and back rivalled in brilliancy those of the peacock's tail; the centre was filled with intense peacock-blue and green, surrounded by a black ring, then one of crimson-scarlet, the side of each segment being coloured with exquisite purple that shades into a more or less rosy violet, the telson and posterior pair of pleopoda being crimson." Unfortunately it is difficult to retain colour in Crustacea; consequently all this brilliancy of tinting disappeared in about twelve hours. Three specimens of this species were dredged by Mr. Angas in St. Vincent's Gulf, in April 1861, four miles from the shore, on a weedy bottom, in 4½ fathoms of water.

The description is taken from the largest specimen. The other two differ from the type, not only in size, being smaller, but also in the depth of the lateral walls of the fifth segment of the pleon.

Genus Caradina, Edwards.

Division A. *Without second appendage or process to the mandible.*

Caradina truncifrons. (Pl. XL. fig. 2.)

C. *rostro tam alto quam cephalon, margine anteriore truncato et serrato, margine dorsali uno dente instructo.*

Length ¾ths of an inch.

Rostrum deeper than the cephalon, the extremity being the deepest part; the anterior margin slightly excavate, and armed with nine small teeth. The rostrum is also furnished with a tooth upon the dorsal surface, immediately above the eyes. The pleon is robust, and but slightly curved. The eyes are small, and planted upon a short peduncle. The superior antennæ reach beyond the extremity of the rostrum. The inferior antennæ are imperfect, but are at least more than one-third the length of the animal; the squamiform appendage is acuminate, subapically tipped with a tooth, and reaches to the extremity of the rostrum. The first pair of gnathopoda are short, spatuliform, the distal extremity being fringed on the inner margin with small but strong spines. The first pair of pereiopoda are much shorter than the second, and by their peculiar formation afford the distinctive character that distinguishes this genus from *Hippolyte*: the propodos is long, ovate, and attached to the inferior process of a hollow or widely crescent-shaped carpus; this is ovate, slightly tapering to the dactylos, which is internally concave, and impinges against a similarly formed process of the propodos. The second pair of pereiopoda are longer than the second gnathopoda, slender and chelate, the propodos being stoutest at the carpal extremity, from which it narrows to the dactylos, which is internally hollow or spoon-shaped, and antagonizes with a similarly shaped process at the extremity of the propodos. The three posterior pairs of pereiopoda are longer and rather more slender than the preceding, are armed upon the posterior margin with five or six equidistant solitary spines, and terminate in an unguiculate dactylos; the posterior pair of pleopoda are about the same length as the telson. Telson terminating obtusely, armed with two strong spines at the apex, and subapically furnished with a short cilium.

The colour of this species when alive was not recorded by Mr. Angas; but since death it has assumed an orange tint, deepening to a red along the line of the primæ viæ.

This description is taken from a female loaded with ova, amongst which were found two specimens of the larva of a Bopyroid Crustacean.

This animal, like the preceding, was captured in about 4½ fathoms of water in St. Vincent's Gulf, on weedy ground, about four miles off the land.

Division B. *Having a fixed denticulated second process on the mandible.*

CARADINA CINCINNULI. (Pl. XL. fig. 3.)

C. *rostri margine dorsali lævi et cincinno parvo supra extremitatem tertii segmenti posteriorem regionis dorsalis. Pleontis antenna superiore quam rostrum longiore, antenna inferiore quam corpus breviore.*

Length ¾ths of an inch.

The back of the carapace is smooth, projecting anteriorly into a rostrum that is only carinated below and armed with six teeth. The pleon is likewise smooth; but the third segment is slightly gibbose,

and furnished upon each side of the central line with a small tuft of hair, from which circumstance the specific name is derived. The eyes are large and prominent. The superior antennæ have the primary appendage but half the length of the secondary, The inferior antennæ have the squamiform appendage reaching quite to the extremity of the rostrum, rounded at the apex, and furnished with a sharp tooth one-third from the extremity, and have the flagellum more than half the length of the animal. The mandible is furnished with a short, fixed, small, anteriorly directed process. The first pair of pereiopoda are short, robust, and have the propodos long ovate, narrowing slightly towards the dactylos, and articulating upon the inferior process of the deeply concave anterior margin of the carpus. The second pair of pereiopoda are longer and more slender than the preceding, and have the propodos not larger than the carpus. Posterior pair of pleopoda rather longer than the telson. Telson terminating in two or three small spines.

This species was taken with the preceding, with which it generally agrees in structure, except in the formation of the mandible, which in this specimen has a small anteriorly directed process. This addition, being one of structure, I consider to be sufficiently important to distinguish the present species generically from that of the preceding; but since Milne-Edwards, in his character of the genus *Caradina*, has not described the form of the mandible, it is difficult, until an opportunity offers of examining a specimen of the original species of the genus, to determine which of the two forms of mandible belongs to the type. I have therefore thought it desirable to classify them under Divisions A and B, rather than make a new genus, which must, under the circumstances, be equivocal. Division B approximates in the character of the mandible more nearly to that of the genus *Hippolyte* than Division A.

This description is taken from a female specimen loaded with ova; and if we may judge from the majority of specimens in the small collection being so furnished, we should imagine the month of April, in which they were taken, to be a favourable period for their production.

The colour of this species has not been recorded from the living animal. In its preserved state it is yellowish, blushed with red along the dorsal surface and *primæ viæ*. It was taken, with the previous specimen, in Gulf St. Vincent.

Caradina tenuirostris. (Pl. XL. fig. 4.)

C. *rostro supra dentibus tribus apud basim et infra uno dente apud apicem armato.*

In this species the rostrum is long, slender, and armed with three teeth upon the upper surface near the base, and one upon the under surface near the apex. The pleon is gibbous at the third segment, being slightly produced posteriorly, and dorsally compressed. The eyes are large and prominent, having the peduncle quite half the length of the rostrum. The superior antennæ are one-third longer

than the rostrum, and have the secondary ramus rather shorter than the primary. The inferior antennæ have the squamiform appendage reaching to the extremity of the rostrum, the lateral denticle one-fourth distant from the apex, the flagellum being as long as the animal. The mandibles are furnished with an anteriorly directed or rudimentary incisive process, slightly curved, tapering to the apex, and armed with five small denticles. The first pair of pereiopoda are short, robust, and have the excavation at the anterior margin of the carpus deeply lunate, and the anterior process and dactylos fringed at the margin with several broad and flat teeth and a few hairs. The second pair of pereiopoda are scarcely longer than the first, and are more robust than in the preceding species. The remaining pairs are rather longer than the two preceding, and more slender. The posterior pair of pleopoda are rather longer than the telson, which last differs but little from that of the preceding species.

This description is taken from a female specimen, which is shorter and more robust and gibbous than either of the other species of the genus. The colour of the living animal has not been recorded; but in a preserved state it is yellowish, blushing into red, mostly so upon the dorsal surface and the posterior segments of the pleon.

It was captured, with the other specimens in this collection, by Mr. Angas, in Gulf St. Vincent, under the conditions previously described.

Genus Anchistia, Dana.

Anchistia æsopia. (Pl. XLI. fig. 5.)

A. *rostro supra novem dentibus et duobus infra apud apicem armato. Pleontis tertio segmento in dentem ingentem dorsaliter et posterius producto.*

Having the rostrum nearly straight, armed above with nine teeth, the posterior standing near the centre of the carapace, and with two below near the apex. There is also an infraorbital, as well as a postorbital, and an anterior branchial tooth. The pleon has the third segment postero-dorsally carinated and elevated into a hump-like tooth, being posteriorly produced to a point. The eyes are half as long as the rostrum. The superior antennæ have the peduncle as long as the rostrum; the first joint, being longer than the other two, is broad, squamiformly developed, and armed with two teeth, a large one near the base, and a smaller one near the distal extremity; near the base, in the position of the auditory organ, unlike that of its near ally *Palæmon*, there is a distinct otolithe; the next two joints are short; the flagella are three, the primary and secondary being fused together for about two-thirds the length of the primary, the secondary being half as long again, and the tertiary being only one-third the length of the primary. The inferior pair of antennæ have the squamiform appendage round at the point, furnished with a tooth one-third from the apex, and reaching quite to the extremity of the rostrum—the flagellum being as long as the animal. The mandibles are of the same form as in *Palæmon*. The second pair of gna-

thopoda are pediform. The first pair of pereiopoda are chelate, slender, the propodos being slightly enlarged, and the dactylos straight and nearly as long as the propodos. The second pair of pereiopoda are longer than the first, and also larger; the dactylos is slightly longer than the antagonizing process of the propodos, but not longer than the propodos independently of the dactyloid process. The posterior three pairs of pereiopoda are about the same length as the first, but more slender, and have the propodi armed with a few short spines. The posterior pair of pleopoda are slightly longer than the telson. Telson obtuse at the apex, and furnished with two long and four short spines.

This species has not had the colour observed when alive; but in a preserved condition it is yellowish, mottled with red, especially upon the pereiopoda, antennæ, and rostrum. It was taken, with the preceding species, in Gulf St. Vincent.

In this species there are two remarkable and interesting peculiarities existing in the superior antennæ. The one is, that at the base of each appears an appendage very like a true otolithe. In Dana's figure of *A. ensifrons*, the organ that he has drawn in the same position, I have little doubt, demonstrates the presence of the same. This is so unusual that I know of no other species with such a structure, except it be a Stomapod spoken of by Huxley. This organ bears a near resemblance to that which Van Beneden considers to be an otolithe, and which was found by him in the inner ramus of the posterior pair of pleopoda in some species of Stomapoda. The second peculiarity in the condition of the superior antennæ is the fusion of the primary with the secondary appendage through nearly the entire length of the former—and this not by an absorption of the one into the other, but by an apparent union of the two along their margins. This condition exists occasionally more or less in other genera.

Crangon.

Crangon intermedius. (Pl. XLI. fig. 6.)

C. *tres dentes supra regionem branchialem anteriorem et ordinem parvulorum dentium post externum dentem orbitæ habens.*

Having the carapace armed with three teeth on the antero-branchial surface on each side, and a row of minute denticles extending from the extraorbital tooth posteriorly between the cardiac and branchial regions. The rostrum is nearly as long as the eye. The superior antennæ are three times as long as the eye, having the rami subequal and as long as the peduncle. The inferior antennæ have the squamiform appendage reaching nearly to the extremity of the superior antennæ. The first pair of pereiopoda are subchelate, strong, having the palm oblique, marginate, and armed with alternating long and short hairs. The second pair of pereiopoda are chelate, slender, and do not reach beyond the carpus of the first. The third pair of pereiopoda are slender and longer than the first; the remaining two pairs are shorter, being but a little longer than the second. The pleon is short, being scarcely longer than the carapace, and suddenly narrow-

ing at the fifth segment. The posterior pair of pleopoda are not longer than the telson, which is narrow and tipped with two long hairs.

This species was taken at the same time and place as the preceding.

The following species is sufficiently distinct in its organization from *Idotia* to induce the construction of a separate genus for its reception.

Crabyzos, nov. gen.*

Cephalon et pereion æque angusta, segmento primo pereii cum cephalo conjuncto. Antennæ superiores non longiores quam cephalon. Antennæ inferiores admodum longiores quam superiores. Pereiopoda simplicia, dactylis in duos dentes terminantibus; omnia pereiopoda post primum par tenuia et brevia.

The animal is long and slender, the pereion not being broader than the cephalon. The first joint of the pereion is fused with the cephalon; the superior antennæ are not longer than the cephalon; the inferior are much longer than the superior. The first pair of pereiopoda are tolerably robust and long, the rest are short and feeble, and all terminate in a double-toothed apex to the dactylos. The pleon is slightly narrower than the pereion, and has all the somites formed into a single joint; the pleopoda are protected by opercula.

Crabyzos longicaudatus. (Pl. XLI. fig. 7.)

Pleon in cuspidem longam terminans, segmento primo et cephalo æquis; antennæ superiores breviores quam cephalon; antennæ inferiores tam longæ quam pereii segmentum secundum.

The cephalon and first joint of the pereion are of equal length; the others gradually decrease in length posteriorly; the dorsal surfaces are nearly flat, while the margins with the coxæ stand nearly perpendicular to them. The pleon gradually narrows posteriorly, where it terminates in a long cusp or point. The eyes are round and prominent, and placed near the latero-anterior margins. The superior antennæ are shorter than the cephalon. The inferior antennæ are about four times as long as the superior, and reach to the extremity of the second somite of the pereion. The first pair of pereiopoda are tolerably robust and long; all the others are shorter and more feeble; all terminate in double-pointed dactyli, which form with the propodi prehensile organs. The pleopoda are enclosed within two laterally attached opercula.

The animal is described as being of an apple-green colour, darker along the line of the primæ viæ, and covered with numerous minute spots over the surface generally.

Three specimens were taken, one of which is $1\frac{1}{2}$ inch long, the other two being scarcely more than 1 inch—a circumstance probably dependent upon sexual distinction.

These were taken at the same time with those previously described.

* Deriv. κράβυζος, a little shellfish.

EXPLANATION OF PLATES XL. & XLI.

Fig. 1. *Angasia pavonina* (White).
C. Rostrum.
P. Pleon.
b. Superior antennæ.
b''. Otolithe of ditto.
c. Inferior antennæ.

Fig. 1. *d*. Mandible.
k. First pair of pereiopoda.
k'. Dactylos of ditto.
l. Second pair of pereiopoda.
u. Posterior pair of pleopoda.
z. Telson.

N.B. These letters refer homologically to each animal alike.

Fig. 2. *Caradina truncifrons*.
Fig. 3. —— *cincinnuli*.
Fig. 4. —— *tenuirostris*.
Fig. 5. *Anchistia æsopia*.
Fig. 6. *Crangon intermedius*.
Fig. 7. *Crabyzos longicaudatus*.

5. Description of a New Species of Flexible Coral belonging to the Genus Juncella, obtained at Madeira. By James Yate Johnson, Corr. Mem. Z.S.

Fam. Gorgonidæ.

Sect. Gorgonellaceæ, Val.

Juncella flagellum, sp. nov.

Simple, elongated, slender, flexible, slightly twisted on its own axis, and tapering upwards. Bark calcareous, white, smooth, and impuncturate, enveloping a hard grey axis, which has a somewhat polished surface marked with straight striæ. This axis is so highly charged with carbonate of lime that it effervesces in muriatic acid. The coral is quadrangular in section, and has on each of the two narrower sides two series of closely set papillæ, having the eight lobed orifices of polype-cells at their apices. These papillæ are obpyriform or ovate; and in dried specimens they are turned upwards and adpressed to the stem. Near the base of large specimens the papillæ are in three somewhat irregular rows. The other two sides of the stem are free from papillæ, but there is a slightly elevated line along the middle. The base spreads out to a moderate extent upon the object to which it is attached. The spicula, of which the bark is composed, are tuberculated staves two or three times as long as broad, the tubercles having a tendency to collect at the extremities.

The longest example of this coral which I have seen, measured about 7 feet in length; and it was without its basal portion. The greatest thickness was three eighths of an inch; the largest papillæ were the tenth of an inch in length, and about the same across. In another example, 5 feet in length, the base spread out to the size of a shilling; and the papillæ commenced about 3 inches above this basal expansion. The smallest specimen that has occurred was 31 inches long; and this has been sent to the British Museum. In the collection of that establishment there is a large stone with numerous specimens of this coral upon it, alongside examples of *Callogorgia verticillaris*, Gray (*Primnoa verticillaris*, M.-Edw.). These were brought from St. Michael's, one of the Azores, and presented to the Museum by Mr. McAndrew.

I have ventured to assign this coral to the genus *Juncella*, Val.,

although a naturalist for whom I entertain the highest respect considers it to be the *Scirpearia mirabilis* of Cuvier. There is, however, so much doubt as to what the coral so named by the illustrious Frenchman really is, that I hesitate to ascribe mine to that species, the more especially as it clearly falls within the definition of the genus *Juncella* (as it appears in the 'Histoire Naturelle des Coralliaires' of Milne-Edwards, vol. i. p. 186), forming a member of the section of *Gorgonellaceæ* which is made up of Gorgoniad corals having a smooth bark and a sublithoid axis containing so much carbonate of lime as to effervesce in muriatic acid. From *Juncella juncea*, Esper, and *J. vimea*, Val. (species found at the island of Bourbon), it would seem to be distinguished by the large size of the cup-bearing papillæ; from *J. elongata*, a Mediterranean species, by its being simple, not branched. *J. hystrix*, *J. surculus*, and *J. caliculata* appear to be names without descriptions.

As to the difficulty of identifying *Scirpearia*, the following passage from M. Milne-Edwards's work, already referred to, may be quoted:—

"The Alcyonarian described and figured by Linnæus under the name of *Pennatula mirabilis* seems to be very little connected with *Virgularia mirabilis* as some have suggested. It has a slender stem, attenuated at the two extremities, and bearing at each side a simple series of widely separated polypes. Cuvier formed of it the genus *Scirpearia*, which has been adopted by Ehrenberg. Lamarck placed it in his genus *Funiculina*, near *Pavonaria*, under the name of *F. cylindrica*. Fleming thought that the species was not distinct from *Virgularia*; and Blainville affirmed that it was nothing but a *Gorgonia*. None of these opinions seem to me admissible. It is too imperfectly known to have a place assigned to it in a scientific classification of corals."—*Hist. Nat. Corall.* i. p. 214.

6. Description of a New Genus and of Twelve New Species of Mollusca. By Arthur Adams, F.L.S., etc.

Genus Eutrochus, A. Ad.

Testa trochiformis, tenuis, perspective umbilicata; anfractibus planis, transversim liratis. Apertura subquadrata, intus margaritacea, labio rectiusculo, margine acuto, subreflexo, antice in dentem obtusum desinente.

A form of *Trochidæ* most nearly resembling a *Ziziphinus* with a perspective umbilicus similar to that of *Architectonica*.

1. Eutrochus perspectivus, A. Ad.

E. *testa depresso-conoidea, late et profunde umbilicata, pallide carnicolore, fulvo sparsim maculata et flammulis fulvicantibus picta; anfractibus 7, planis, transversim valde liratis, liris inæqualibus subdistantibus, ad suturas angulatis, anfractu ultimo ad periomphalum granuloso; apertura intus sulcata.*

Alt. 1 inch, lat. 1½ in.

Hab. Tasmania (*Coll. Cuming.*).

The shell is broader than high, rather thin, and of a pale yellowish flesh-colour, with fulvous blotches and flammules. The whorls are transversely ridged and angulate at the sutures, and the interior of the umbilicus is white. Mr. Cuming possesses but a single specimen from Tasmania.

2. MODELIA GUTTATA, A. Ad.

M. *testa turbinato-conica, umbilico callo obtecto, spira elata, carnicolore, aureo tincta, guttulis rubidis conspersim depicta; suturis canaliculatis, profundis; anfractibus convexis, cingulis granorum moniliformibus subdistantibus instructis, granis disjunctis, interstitiis longitudinaliter oblique striatis, ad suturas serie tuberculorum squamiformium ornatis: apertura circulari, intus sulcata; labio excavato, callo tenui lato umbilicum tegente.*

Hab. Tatiyama.

The necklace-like rows of granules are separate from each other; the whole shell is adorned with reddish points, and has a golden aspect like some species of *Turcica* and *Ziziphinus*.

3. LEIOPYRGA CINGULATA, A. Ad.

L. *testa pyramidato-turbinata, anguste perforata, tenui, nitida, purpurascente, ad basin albida, serie macularum rufescentium ornata; anfractibus* 4, *planis, cingulis elevatis distantibus* (3 *in anfractu ultimo*) *instructis; basi concentrice valde lirata; regione umbilicali cingulo elato circumcincta.*

Hab. Port Essington (*Coll. Cuming.*).

This is a second and very distinct species of a genus proposed by my brother and myself under the name of *Leiopyrga*. The present species has the whorls encircled with three transverse ridges, and there is a conspicuous ridge round the region of the umbilicus.

4. TURCICA IMPERIALIS, A. Ad.

T. *testa conoidea, spira acuminata, basi obliqua producta; solida, imperforata, fulvicanti-rufo variegata, cingulis transversis castaneo articulatis ornata; anfractibus convexiusculis, lirulis moniliformibus, lineis elevatis transversis alternantibus et cingulo valido noduloso ad peripheriam ornatis, interstitiis oblique striatis, suturis canaliculatis, superne serie granulorum instructis; anfractu ultimo cingulo granorum in serie duplici dispositorum munito; basi convexa, cingulis granulosis concentricis instructa: apertura obliqua, subcirculari; labio tortuoso, antice in dentem desinente; labro margine integro, subexpanso, intus lævi.*

Hab. Tsusaki, 37 fathoms, west coast of Japan.

This fine species is more elevated than *T. monilifera*; the base is more oblique, the aperture much more produced, and the golden nacreous appearance is absent.

5. TURCICA CONCINNA, A. Ad.

T. *testa parva, ovato-conica, imperforata, albida, solida; anfractibus convexiusculis, subimbricatis, sutura profunda canaliformi sejunctis, infra suturam concinne crenulatis, liris transversis ubique cinctis, interstitiis concinne clathratis; basi convexa: apertura obliqua semicirculari; labio tortuoso, in dentem terminante; labro subincrassato, intus obsolete sulcato.*

Hab. Uraga.

This species most nearly resembles *T. instricta* of Gould, but is less elevated, and the last whorl larger and more rounded.

6. TURCICA STELLATA, A. Ad.

T. *testa parva, elata, ovato-conica, imperforata, alba; anfractibus* $5\frac{1}{2}$, *planis, imbricatis, sutura canaliculata sejunctis, infra suturam concinne crenatis et liris transversis, interstitiis valde punctatis, inferne ad peripheriam serie nodulorum acutorum compressorum apertorum stellatis; basi convexa, liris concentricis validis interstitiis valde clathratis ornata: apertura oblique semicirculari; labio recto, in dentem terminante; labro margine valde crenato, intus sulcato.*

Hab. China Seas.

This is a very pretty species, with the whorls stellate at the periphery. It is more acutely conical than the other species.

7. MUREX SCALARINUS, A. Ad.

M. *testa ovata, rimato-umbilicata, pallide fulva, rufo sparsim tincta, tenui; spira elata, acuta, aperturam æquante; anfractibus* 5, *convexiusculis, spiratis, varicibus quinque vix elevatis æquidistantibus* (*in anfractu ultimo* 6) *instructis, costis lamellosis transversis, marginibus rotundatis crenulatis et liris intermediis minoribus crenulatis ornatis, suturis profundis: apertura ovata, subpatula; labio lævi, arcuato; labro extus varicoso, canali mediocri aperto ad sinistram inclinato.*

Long. 1 inch, lat. 3 lines.

Hab. ——? (*Coll. Cuming.*).

An exquisitely sculptured species, with rib-like varices and spirate whorls, and partaking somewhat of the characters of a *Trophon.*

8. MUREX ALABASTRUM, A. Ad.

M. *testa ovato-fusiformi, alba; spira elata, quam apertura longiore; anfractibus convexis, varicibus validis rotundatis squamosis, squamulis incrassatis imbricatis postice productis et spiniformibus instructis, interspatiis nodoso-plicatis, squama lobiformi erecta ad suturas ornatis, transversim in toto striatis et lirulis transversis ad plicas nodulosis instructis: apertura parva, ovata; labio lævi, arcuato, canali mediocri angusto recurvato; labro extus late varicoso.*

Long. 14 lines, lat. 3 lines.

Hab. Martinique (*Coll. Cuming.*).

There is a large, rounded, ascending scale on the whorls between the solid buttress-like varices, which latter are spiny at the hinder part.

9. MARGINELLA DEBURGHI, A. Ad.

M. *testa elongato-ovoidea, polita; spira obtusa, callo castaneo obtecta; pallide carnicolore, maculis sanguineis rotundatis in seriebus transversis dispositis, majoribus cum minoribus alternantibus, pulcherrime picta: apertura angusta, antice subdilatata; columella nuda, plicis 5 obliquis; labro intus sulcato, margine incrassato.*

Long. $5\frac{1}{3}$ lines, lat. $2\frac{1}{2}$ lines.

Hab. Swan River (*Coll. Cuming.* et *De Burgh.*).

A very charming species, painted with red spots disposed in regular cross rows, and with intermediate dotted lines of the same colour. It is named in compliment to Mrs. De Burgh, a lady well known for her knowledge of shells, and the possessor of a very splendid collection.

10. LIMATULA JAPONICA, A. Ad.

L. *testa oblonga, æquilaterali, ventricosa, tenui, alba; area cardinali transversa, recta; auribus mediocribus, acutis; longitudinaliter radiatim tota costata, costis æqualibus acutis; concentrice striata, striis sublamellosis imbricatis; margine ventrali crenato.*

Hab. Japan (*Coll. Cuming.*).

A broader and more ovate species than *L. bullata*, Chemn., with a straight hinge-margin, small acute auricles, and conspicuous sharp radiating ribs.

11. LIMATULA FALKLANDICA, A. Ad.

L. *testa ovata, ventricosa, æquilaterali, alba; area cardinali vix arcuata; auribus parvis, acutis; longitudinaliter radiatim tota costata, costis confertis æqualibus subacutis ad latera obsoletis; concentrice striata, striis undulatis validis; margine ventrali crenato.*

Hab. Falkland Islands (*Coll. Cuming.*).

A broader species than *L. japonica*, with numerous close-set radiating ribs, which are obsolete or wanting at the sides.

12. LIMATULA CEYLANICA, A. Ad.

L. *testa ovata, ventricosa, vix obliqua, æquilaterali, alba, radiatim costata, costis æqualibus acutis crenulatis; concentrice striata, striis confertis imbricatis sublamellosis; auribus acutis, parvis; area cardinali angusta, recta; margine ventrali crenulato.*

Hab. Point de Galle (*Coll. Cuming.*).

A species about the same size as the European *L. subauriculata*, but more ventricose and less elongated, and with the ribs acute and finely crenulated.

December 8th, 1863.

E. W. H. Holdsworth, Esq., in the Chair.

Mr. A. E. Knox made some remarks on the supposed date of extinction of the Mole (*Talpa vulgaris*) and the Weasel (*Mustela vulgaris*) in Ireland.

Mr. Fraser exhibited the skin of a Leopard from Japan, which he identified as being the *Felis* (*Leopardus*) *japonensis* of Dr. Gray, described and figured in the Society's Proceedings for 1862, p. 262, pl. 33. This, being the second specimen only which had come under the notice of the scientific world, tended to confirm the views of Dr. Gray as to the distinctness of the species.

The following letter, addressed to the Secretary by Mr. W. H. Pease, Corr. Member, and dated Honolulu, Sandwich Islands, Oct. 1, 1863, was read to the Meeting:—

"Sir,—I have received lately the 'Proceedings of the Zoological Society' issued during the past three years. On looking over them, I discover a few errors and omissions in the papers contributed by me, which are of sufficient importance to be corrected, viz.:—

"P. Z. S. 1860, p. 32.—The genus '*Doriprismatica*' is so divided in printing, that the species described would appear to belong to the genus *Doris*. They should stand as '*Doriprismatica imperialis*' and '*Doriprismatica lineata*.'

"P. Z. S. 1861, p. 245.—It appears that I omitted the specific name of the *Pleurobranchus* here described. It should read '*P. tessellatus*'; and on the following page (246), the *Lobiger* there described is *L. viridis*.

"P. Z. S. 1860.—In the Table of Contents I am credited as being the author of a new genus of *Planariidæ*, bearing my own name!—'*Peasia*,' and several species. The mistake will be explained by referring to the footnote, page 37. I should not consider this of sufficient importance to notice, had not one of the editors of the 'American Journal of Science and Arts' fallen into the same error, and taken occasion to publish a very harsh and severe criticism on that paper.

"Yours &c.,
"W. H. Pease."

"I also notice that several of the names of the species described in my papers in 1860, have been preoccupied by Dr. Kelaart. I therefore propose to change them as follows:—

"*Doris excavata*, Pease, into *D. oreosoma*.
"*Doris papillosa*, Pease, into *D. tincta*.
"*Pleurobranchus reticulatus*, Pease, into *P. violaceus*."

The Secretary read the following note on the breeding of an exotic Tortoise at Tregullow, in Cornwall, the seat of Mr. William Williams, F.Z.S., in continuation of a former communication on the same subject *:—

"The head gardener found a single egg this year, on the 7th July, and immediately removed it to a pine-pit, the temperature of which has been about 70° at night and from 85° to 90° by day. On the 28th of September a fine male specimen was hatched, stronger than those produced last year. After the egg had been deposited in a hole similar to that mentioned in a former account, the Tortoise proceeded to make it stand upright; having accomplished this, she at once covered it with earth.

"The young one burst the shell on the side, and walked away, leaving the other half entire.

"Tregullow, 30th September, 1863."

The following papers were read:—

1. On the Systematic Position of the Crested Screamer (Palamedea chavaria). By W. K. Parker.

Many years ago, at a time when the only collection of foreign living creatures seen by me was contained in Wombwell's travelling menagerie, my observations on the structure of birds were necessarily confined, for the most part, to our native species. I am glad of this now, as they are nearly all of *pure* types; and from childhood their life and conversation yielded me a pleasure nearly equal to that derived from communion with bipeds of the plumeless kind.

If the structure of the pure or unmixed types had not been studied by me first in such a way as to make the most definite mind-images, there would have been for me no good firm ground to stand upon whilst contemplating the structure and relationships of such birds as the Trumpeter (*Psophia*), the Cariama (*Dicholophus*), and the *Palamedea*. Any study, however, of the Birdclass which should go no further than its own border-line would be fruitful in bringing to light difficulties and even paradoxes: a physiologist might as well study the functions of one class of organs to the total neglect of the rest of the body, the beautiful *whole*. I have for some time past held to the belief that the birds should not be termed a class, as though they formed a group *equal* to that of the Mammalia; I find that Professor Huxley holds the same views.

If that is the case, we have some explanation of the great uniformity of the feathered tribes; for it is a fact that the remotest forms in the group are really not far apart in nature, and the smaller groups are closely intertwined one amongst another.

There are two principal conditions of nearness to the Reptilia in the great Birdgroup: first the combination of mammalian and of reptilian characters with what is truly ornithic, as in the Ostriches;

* See P. Z. S. 1862, p. 266.

and the second is when the aberrant characters are only reptilian, and for the most part *lacertian**.

Now it is with *lacertian* characters, rather than with what we find in the Crocodile and the Chelonian, that we have to deal in such birds as the *Palamedea* and other mixed forms which are not far from it in actual nature, but are striving, as it were, to attain to the full typicalness of other groups than that to which the *Palamedea* really belongs.

The discovery of such a marvellous creature as Von Meyer's *Archæopteryx* must of necessity give the scientific mind a thirsty longing to know more of the relations, and of the true causes of the relations, of these mid vertebrates, the reptiles and birds,—cold-blooded, scaly, slow, and often loathsome on one hand; on the other warm, intensely active, and endued with the highest locomotive powers, and beautiful beyond the power of words to express.

There are two very beautiful groups of birds, rich in species, with very clearly defined characters, both standing at about the same "ornithic" height above the Ostriches, and in a very similar contiguity to the Lizards: these are the true "Gallinæ" and the true "Anatinæ." In the latter family we have all the birds from the Spur-winged Goose (*Plectropterus*) to the Goosander, inclusive; in the former, the "Phasianinæ" and the "Tetraoninæ"—the typical and subtypical Fowls. The Flamingo is truly *lamellirostral*; but its anatine characters are confused and mixed up with those that are derived from the Ibis and the Crane. Again, in the Fowls, we have carefully to keep the "Cracinæ," the "Hemipodiinæ," the "Megapodiinæ," and the "Pteroclinæ" in separate circles, because the *woof* of their nature is one thing, and the *warp* another; they are not zoologically *pure*, not *wholly* Gallinaceous. The parts first formed in the embryonic skull—those which are most central, and least and most slowly affected by the causes that fit each creature for its place and work in nature—these are strangely alike in both the "Sifters" and the "Scrapers"; and for a long while this fact has been a mystery and almost a paradox to me. I care very little for the webs between the toes; their absence or presence may suffice to separate between *genus* and *genus*, but not between *family* and *family*, still less between *order* and *order*.

The water-birds may, however, be divided very easily into two groups by the presence or absence of two very curious membranous spaces appearing in the occipital plane. These *fontanelles* separate the auditory from the superoccipital cartilage,—and are scarcely open at all in the true "Ardeinæ," the "Rallinæ," the "Podicipinæ," and the "Pelecaninæ"; nor do they appear in the Land and Tree groups of birds.

In the "Ibidinæ," the "Lamellirostres," the Gruine, Pluvialine, and Tringine groups, they are large and persistent; in the "Larinæ" they soon fill up with bone, and so they do in *Œdicnemus*, and apparently in the Bustards. Now the great embryological distinctions

* The skull of every bird known conforms, on the whole, not so much to the *crocodilian* as to the *lacertian* type; their horny jaw-sheaths, large symmetrical sternum, and almost fixed ribs are *chelonian* in their nature.

between the skull and face of the Geese and Fowls are, first, that in the latter the space between the periotic mass and the superoccipital cartilage is a mere chink, in the latter a persistent oval space; and secondly that the anterior parts of the face, viz. the premaxillæ, prevomers, and dentaries are small and compressed in the Fowls, large and outspread in the sifting birds. The body of the tongue partakes of the general expansion of the face in the Geese; the descending part of the lachrymal suffers from the general contraction of the parts in the face of the Fowl. Moreover the true Fowls ("Phasianinæ" and "Tetraoninæ") have the head of the os quadratum less bifid at its joint with the skull, and therefore nearer the Ostriches and reptiles in its structure than the same bone in the Goose-tribe. It is highly worthy of remark, however, that the Sand-Grouse, *Hemipodii*, Megapodes, and Curassows all agree with the Geese and their allies in having a subornithic condition of this famous bone; and its upper articular crura begin to be quite distinct representatives of the legs of the mammalian "incus." This, be it noticed, makes the four groups of mixed "Gallinæ" correspond, not only with the Lamellirostres, but also with all those puzzling border-birds which must be studied in connexion; such as *Psophia*, *Parra*, *Cariama*, and *Palamedea*.

Now the Rail-tribe, to which *Palamedea* has been supposed to belong, has been for a long time burdened (on paper) with a very false army-list. Everything alive that has had the misfortune to be possessed of large unwieldy feet has been added to this feeble-minded, cowardly group, until it has become a mixed multitude, with discordant voices, and with manners and customs having no consonance or relation. In a former paper I had the assurance to disband the Cassowaries and Megapodes; in the present I shall permit all birds having much of the nature of the Plover (such as *Parra*), and all those which have in them the nature of a Goose, to depart from the Rail-tribe: I shall retain the *Psophia* as an outpost, notwithstanding that it is more than half a Crane.

A very large number of the genera of birds partake of a structure and nature which may very appropriately be called Passerine; and another very large group, both of genera and families, may also be called Pluvialine,—the common Golden, Grey, and Dotterel Plovers being typical of these groups, which run up through the Sandpipers and Curlews to the Ibises in one direction, through the Lapwing and Stone-Plover to the Bustards and Cranes in another, and through *Chionis* and the Pratincole to the Petrels and Gulls. Still this does not exhaust the pluvialine birds; for the Geese and their allies are related on one hand to the Ibises through the Flamingo, and on the other to the Cranes, although the proper connecting link in this case is doubtful, *Palamedea* lying obliquely, not directly, between them. The Megapodes, Hemipodes, Sand-Grouse, and Tinamous also have no little proportion of the Plover in their nature. The Jacanas (*Parra*) are essentially Plovers, although they have something of the Rail in them, especially in their skull; and they are united to the typi-

cal forms by other Spur-winged Plovers (*Pluvianus spinosus*, Gould). Now, looking at the anatine birds as a great division of specialized forms parallel with, and intimately related to, the pluvialine birds, we begin to see how they can be related to the mixed "Gallinaceæ," which have so much of the Plover in their essence. But we had much, at starting, in common between the typical and pure Fowls and the Duck and Goose tribe; add to this the fact that the Mound-makers and Curassows come much nearer to the "Anatinæ," and then suppose an anatine bird in which the horny denticles are feeble, but abundant, and the jaws compressed, stout, and trenchant, the same bird having the occipital region in harmony, not with the Geese, but with the Fowls,—put all these things together, and we shall be supposing what really exists in the *Palamedea*. Then we can calmly look at the fact that those Geese which have spurs in their wings, like those of the *Palamedea* (viz. *Chenalopex* and *Plectropterus*), have their legs longer, more grallatorial, and better under them than the typical forms, and that the Spur-winged Goose (*Plectropterus*) has a pelvis exactly intermediate between that of a typical Goose and that of a *Palamedea*. It is worth while to notice the thick down that covers the *Palamedea*, the height of the bare tract on the tibia, and the reticulated tarsi, like those of the Goose, and not like those of the Cranes and Rails, which have them scutellate in front. Whilst removing the viscera, I saw that the trachea and inferior larynx were truly anserine; for there are no inferior laryngeal muscles, the contractors of the trachea ending one-third of an inch above the bifurcation, and only a delicate fan-shaped fascia going to the half-rings. Moreover the trachea itself, from being flat and cartilaginous, becomes round and then compressed and osseous an inch above the bronchi, so that it cannot be mistaken for the trachea of any other than an anatine bird. There is nothing whatever in the digestive organs, which are extremely voluminous, to separate the bird from the Geese; yet the gizzard is not so strong as in the types, and the cæca coli are shorter and wider. I have at present only hinted at the osteology of the *Palamedea*. It diverges from the Goose in all this part of its composition, just as much as it converges towards the Curassow and the *Talegalla*; but it is not only more galline than the true Geese (we have seen that both Geese and Fowls have much in common), it is also plainly more *lacertine*. It will require a goodly memoir to do it justice; but in this short notice I must mention one or two things. Its *large soft* tongue, which has not the papillæ horny, has in it the cerato-hyals, ossified from separate points as in the Goose and Hen, much nearer the former than the latter; but the free thyro-hyals are flattened from above downwards, and cannot be mistaken for those of any other but an anserine or anatine bird. All the skull and face, except at its two ends, conforms to the lamellirostral type. Point by point, process by process, lamina for lamina, all else is truly and distinctly that which belongs to the Sifter, and to no other bird. It may be said indeed that this bird is not a Sifter; it is, however, a browzer and a *grazer*; and being of Lincolnshire descent, and

familiar with the fens, I am well acquainted with the grazing habits of the typical Goose*. There is a little of the Crane in the sternum; but, on the whole, the skeleton may be said to belong to a very *lacertian* Goose. This is cautiously said; for have we not four fore claws in the wing, extremely long sprawling toes, and the ribs perfectly destitute of the nearly universal tie-bones or appendages? This deficiency is unique amongst birds; and the Crocodiles possess these appendages: I consider this a *lacertian* character, as their occasional presence in Lizards is as exceptional as their absence in birds. Now amongst the rib-like bones in the fossil skeleton of the *Archeopteryx* I see nothing like an appendage starting from any one of them; nor has Professor Owen figured anything of the kind in his beautiful memoir in the 'Philosophical Transactions.' Let it be added that, although several genera of birds have spurs to their wings, these birds all lie nearly on the *same ornithic plane* as the *Palamedea*, —the Syrian Blackbird (*Merula dactyloptera*) (see Professor Owen on *Archeopteryx*, p. 39) being the only exception. The Megapode is also mentioned by Professor Owen (*ibid.*); but that is a great help to me, and comes in well.

So we see that the birds with nails in their wings are (with one or two exceptions) all aquatic types, the more unspecialized forms of which are for the most part possessed of dorsal vertebræ conjoined by a cup-and-ball (opisthocœlian) articulation, and are very far below the typical tree-birds in their structure and in their habits.

But the digit-claws appear in other birds which have not outstanding spurs. Professor Owen (*ibid.* p. 39) mentions the *Apteryx* has having the mid digit terminating in a joint, which supports a curved claw; the Emeu and the Cassowary have the same structure; and the *Rhea* has an ungual phalanx covered with a claw added to the index-finger, which is generally composed of one joint in birds. The Swan, as well as the Chaja (*Palamedea*), have the same, and they both have the mid-finger series complete, the last joint being most perfect in the Swan (*Cygnus olor*). The furculum of the *Palamedea* is more like that of that great pluvialine the Bustard (*Otis tarda*) than that of a Goose; but it is very much more solid: its only counterpart for relative size is that of the *Archeopteryx*. The coracoids are strong bony tubes, open below by a large scooped hollow. The sternum of this bird differs from that of the Goose or Swan by just so much as the sternum of the Short-winged Rails, especially *Brachypteryx*, differs from that of the ordinary types. It is narrower behind, and the episternum is gone from the front: yet it is thoroughly anserine in character, for the keel does not reach the end; and, indeed, it is in this respect intermediate between what we see in the Geese and what occurs in the "Totipalmatæ." Eight ribs reach the sternum by hæmapophyses, as in the Swan; there are seven in the Goose, *Psophia*, and Serass Crane. On the right side there are

* "——— the cackling goose,
Close-grazer ——————."
Philips's Cyder.

a pair of floating hæmapophyses (reptilian), and these answer to the fourth and fifth so-called sacral vertebræ. In the Swan these hæmapophyses are better developed, and the penultimate has a long rib reaching it from the sacrum on both sides. And this brings me to say that the sacrum in birds, although actually of great length, has superadded to it a number of dorso-lumbar vertebræ in front, and often several true caudals behind.

Professor Owen (*ibid.* pl. 3. fig. 5) makes the first postfemoral joint in the young Ostrich to be the first true caudal. I cannot agree with him here; for I think that the sacrum in birds is long as a *prolepsis* of that of the mammal, but that it is an exaggeration of the mammalian sacrum. In the *Archeopteryx* there are four vertebræ behind the acetabula before we come to those marked caudal by Professor Owen (*ibid.* pl. 4. fig. 1 *c*, *d*). This has led me to run over the birds' pelves in my own collection and drawings; and the following table, which gives the number of vertebræ, closely embraced and tied together by the extension backwards of the iliac bones behind the acetabula, in different birds, is the result of my observations. I shall remark upon the bearings of these facts afterwards.

Table.

Birds built on the Passerine type.	Corvus frugilegus	4
	Gymnorhina tibicen	4
	Turdus merula	4
	Estrelda phaëton	3
	Pyrrhula vulgaris	4
	Emberiza citrinella	4
	Linaria chloris	4
	Pyranga rubra	4
	Loxia cardinalis	4
	Muscicapa grisola	3
	Budytes rai	4
	Pratincola rubetra	4
	Motacilla yarrellii	4
	Sylvia cinerea	4
	Phyllopneuste trochilus	4
	Parus ater	4
	Hirundo urbica	4
	—— rustica	4
	Sitta europæa	4
	Lanius collurio	4
Caprimulginæ.	Cypselus apus	4
	Podargus humeralis	4
	Caprimulgus europæus	3
Alcedinidæ.	Alcedo ispida	5
	Upupa epops	4
	Dacelo giganteus	4
Trochilidæ.	Trochilus colibris	3
Bucerinæ.	Buceros ruficollis	6
Zygodactyles.	Cuculus canorus	3
	Picus viridis	4
	Corythaix buffoni	4
	Ramphastos toco	6
	Agapornis pullaria	4
	Psephotis multicolor	4
	Psittacus erythacus	4
Accipitres diurnæ.	Falco peregrinus	3
	—— æsalon	3
	—— tinnunculus	3
	Accipiter nisus	3
	Buteo vulgaris	3
	Milvus regalis	3
	Circus cyaneus	3
	—— cinereaceus	3
	Elanus melanopterus	4
	Aquila chrysaëtos	5
	Haliaëtus albicilla	5
	Dicholophus cristatus	5
Vulturinæ.	Neophron percnopterus	5
Accipitres nocturnæ.	Ulula aluco	3
	Strix flammea	3
	Asio otus	3
	Athene noctua	3
Pigeons.	Columba livia	5
	—— palumbus	5
Cracinæ.	Oreophasis derbyanus	5
	Crax globicera	5
Phasianinæ.	Dendrortyx	6
	Gallus domesticus	5
Tetraoninæ.	Lagopus scoticus	4
Hemipodiinæ.	Hemipodius varius	5
Pteroclinæ.	Syrrhaptes paradoxus	6
Megapods.	Talegalla lathami	5
Rallinæ.	Crex pratensis	3
	Ocydromus australis	4
	Gallinula chloropus	4
	Fulica atra	5
Ardeinæ.	Botaurus minutus	4
	Ardea cinerea	4
	—— purpurea	4
	Herodias garzetta	4

Ardeinæ.	Nycticorax ardeola	4
	Tigrisoma leucolophum	4
	Eurypyga helias	3
	Cancroma cochlearia	5
	Balæniceps rex	5
Ibidinæ.	Leptoptilus argala	4
	Scopus umbretta	4
	Threskiornis æthiopicus	5
	Platalea leucorodia	6
Anatinæ.	Phœnicopterus antiquorum	5
	Palamedea chavaria	4
	Plectropterus gambensis*	7
	Anser palustris	9
	Cygnus olor	11
	Dafila caudacuta	7
	Anas boschas	8
	Mergus albellus	8
Gruinæ.	Psophia crepitans	4
Otinæ.	Otis tarda	5
Plovers.	Œdicnemus crepitans	5
	Vanellus cristatus	4
	Charadrius hiaticula	3
Long-billed Plovers.	Hæmatopus ostralegus	4
	Himantopus melanopterus	4
	Numenius arquata	5
	Totanus fuscus	4
Snipes.	Scolopax gallinago	4
	—— gallinula	3
Jacanas.	Parra jacana	4
Ostriches.	Dromaius ater	11
	Struthio camelus	9
	Apteryx australis	4
	Tinamus robustus	8
Gulls.	Glareola torquata	4
	Gavia ridibunda	4
	Larus canus	4
Petrels.	Puffinus brevicauda	5
	Diomedea exulans	5
Grebes.	Podiceps rubricollis	9
Totipalmatæ.	Phalacrocorax carbo	9
Divers.	Colymbus septentrionalis	11
	Uria troile	5
	Alca torda	4
Penguins.	Spheniscus demersus	4

This table is large enough for all reasonable purposes; and its results are very striking, and cannot have had their extreme uniformity caused by chance. If we leave out all those birds which, for swimming and especially diving purposes, have the sacrum extremely long and much anchylosed, such as the Sifters, Grebes, Loons, Cormorants, and also the Ostriches (excluding the *Apteryx*), we shall have four post-acetabular joints as the medium number. A large proportion of all birds have exactly four vertebræ in rear of the thigh-bones; many have only three, and about as many more have five. As a rule, the small birds of a group have the tendency to drop a joint occasionally; thus the little *Estrelda* has one less than the other Finches, the Dotterel one less than the other Plovers, and the Crake one less than the other Rails. The medium-sized rapacious birds, both nocturnal and diurnal, have only three. Now, if we consider that all the vertebræ above four in the posterior part of the Duck's pelvis really belong to the tail, then, as I long ago found, the ploughshare-bone is composed of ten segments, as four of the apparently sacral bones are really caudal; and as there are eight intermediate vertebræ, the large number of twenty-two is obtained—one more than the *Archeopteryx* possesses according to Professor Owen's method of enumeration.

Also in the *Palamedea* two of the anchylosed bones belong to the tail; there are six free bones, the last having had a rather late addition in the penultimate joint, so that it may be considered as eleven: this gives us nineteen caudal vertebræ for the subject of this paper—only two less than in the *Archeopteryx*. The same method gives us twenty-four for the Swan, sixteen for the Emeu, and twenty-two for the Cormorant.

That five of the so-called sacral vertebræ of the *Palamedea* belong to the dorso-lumbar region is evident, because the first three have hæmapophyses reaching the sternum, and on the right side there

* *Anseranas melanopterus*, a very *Gruine* Goose, has only 6.

are two more sternal ribs in a rudimentary condition. There are seventeen vertebræ fused together, five of which must be supposed removed from the front part and two from behind, thus leaving ten proper sacral vertebræ.

In small birds and in birds of the higher types with short pelves, the number of true sacral vertebræ will be only about seven on an average—a common number amongst the large herbivorous Mammalia.

As I have only touched upon the points of interest in this skeleton, when I have acquired a fuller knowledge of it and of its congeners, and of the bearings and relations of the feathered tribes generally, I hope to take it up again. Certainly amongst living birds there is not one possessing characters of higher interest; none that I am acquainted with come nearer, in certain important points, to the Lizard; and there are parts of its organization which make it very probable that it is one of the nearest living relatives of the marvellous *Archeopteryx**.

2. Note on the Breeding of Bennett's Cassowary in the Society's Gardens. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

(Plate XLII.)

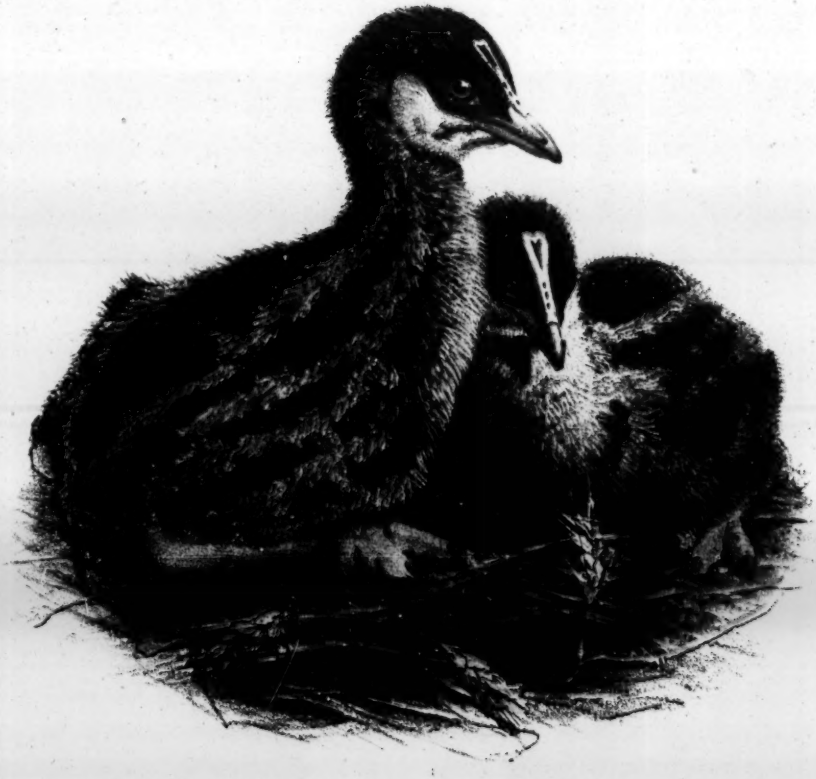
In some notes on the method of incubation of the Struthious birds read before the Society in June last†, I mentioned the fact of our pair of the Mooruk or Bennett's Cassowary (*Casuarius bennettii*), received from Dr. Bennett in 1858, having again commenced breeding in the previous month. The female began to lay in the middle of the month of March, and deposited eggs at intervals of about eight days. The male bird commenced the duty of incubation on the 25th of the month, at which time five eggs had been deposited. One other egg was subsequently laid by the female. On the 17th of June, after an incubation of fifty-two days, a single young bird was produced, which, however, was in a very weak state, and only lived about twelve hours.

The accompanying drawing by Mr. Wolf will serve to record the external appearance of this interesting chick, which is, I believe, the only existing example of a young bird of any species of Cassowary bred in Europe.

I may remark that this is the fourth year in which our female Mooruk has attempted to breed. In April 1860 three eggs were laid without intercourse with the male bird, and of course unfruitful. In 1861 four unproductive eggs were likewise deposited, although frequent copulation had taken place between her and a male Common

* The cup-and-ball joints in the dorsal region of many water-birds and of the Parrots must be looked upon as a *general* reptilian character; so also the single head of the "os quadratum" in the Ostriches. The very simple palatines of the latter birds and of the *Palamedea*, the very long free toes and the simple ribs of the Screamer, all these are more properly *lacertian*.

† See *anteà*, p. 233 *et seq.*



1
2

CASUARIUS BENNETTII (Gray)

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Cassowary. In 1862, out of six eggs deposited, which we had every reason to believe were duly impregnated, frequent copulation having taken place with the male Mooruk, a single young one, apparently a fine and healthy bird, was hatched on September 4th, after seven weeks' incubation by the male bird. Unfortunately, however, the young bird was destroyed by rats the night after its birth.

3. On the Land-Shells of South Australia.
By George French Angas, Corr. Mem.

Until very recently the terrestrial Molluscan fauna of the province of South Australia was almost unknown to science, two species of *Helix*, a *Succinea*, and a *Blanfordia* constituting all the described species; and of these, both the *Helices* occur also in other parts of Australia, and the *Blanfordia* in Tasmania. The absence from the colony of collectors or persons interested in natural history, and the rarity and local distribution of the species, may account for our hitherto limited acquaintance with the subject.

The dryness of the climate during a greater portion of the year, together with the absence of underwood or luxuriant vegetation, are inimical to the development of the Pulmonifera in South Australia; whilst the rich belts of tropical forest called "brushes," that extend along the east coast of Australia between the Cordillera and the Pacific Ocean, are the abode of numerous fine species, including those large *Helices H. falconeri* and *H. macconnelli*, and that peculiar flattened group of which *H. cunninghami* may be regarded as the type. As these primeval belts of forest fall before the axe of the settler the larger species will probably disappear at no very distant period, or be found only in a semifossil state, like the *Pachyotis* of St. Helena. With the exception of a small *Succinea* (*S. arborea*, Ad. & Ang.), none of the South Australian Pulmonifera appear to be arboreal in their habits. The vast tracts of fertile park-like country, studded with gigantic *Eucalypti*, are as destitute of Snails as are the arid sandy regions of the Mallee scrub. The few localities throughout the colony favourable to molluscan existence are those where patches of small bushes occur amongst rocks and in deep glens and ravines of hills, which afford shelter from the sun and the hot northerly winds. Several species are also met with beneath the tufts of "salt-bush" that are scattered over the vast plains of the interior towards Lake Torrens, and in the crevices of sandstone rocks, and under stones and decayed logs.

During a residence of three years in South Australia my researches were rewarded by the discovery of twelve new species of *Helix*, two of *Bulimus*, a *Succinea*, and a *Vertigo*, many of which have been lately described by Dr. Pfeiffer, &c., either in these 'Proceedings' or in the French 'Journal de Conchyliologie.'

Subjoined is a list of all the species of South Australian Pulmonifera that have been described, to which are added descriptions of several other species by Arthur Adams and myself.

1. HELIX (XANTHOMELAN) PERINFLATA, Pfr.

An interesting species belonging to a North Australian group, of which *H. pachystyla* is the type. The single specimen in my collection was obtained at the McDonnell Ranges, in the far north of the colony, by my friend Mr. Waterhouse, who accompanied Stuart's expedition.

2. HELIX (HADRA) LORIOLIANA, Crosse.

This is the largest South Australian species yet discovered. It is an elegant shell, with a somewhat effuse aperture, of a yellowish horn-colour, banded with orange-brown.

From the ravines of the western slopes of Flinders Range, near the head of Spencer's Gulf.

3. HELIX (HADRA) ANGASIANA, Pfr.

In form more globular than *H. lorioliana*, deeply umbilicated, and with the aperture smaller, and the outer lip thickened and reflexed. The style of colouring is very similar to the preceding.

Found under "salt-bushes" on the plains at Arrowie, near Lake Torrens.

4. HELIX (HADRA) CASSANDRA, Pfr.

A delicate pale-brown and whitish-banded species, somewhat depressed in form, with the outer lip but slightly reflexed.

From bushy patches amongst the sandstone-cliffs on the banks of the Lower Murray River.

5. HELIX (HADRA) LINCOLNIENSIS, Pfr.

A rich-purplish, vinous-brown, somewhat depressed species, with the outer lip rather thin.

From under logs and bushes at Port Lincoln.

6. HELIX (HADRA) EVANDALEANA, Pfr.

An interesting species, with the whorls keeled at the periphery, of a rugose character, with a large umbilicus, and of a peculiar snuff-brown colour.

Found under dead logs at Evandale.

7. HELIX (HADRA) STUTCHBURYI, Pfr.

A somewhat thin, pale straw-coloured shell with a faint band; intermediate between *H. cassandra* and *H. gilberti* of New South Wales.

From the scrubs near Port Elliott.

8. HELIX (HADRA) PATRUELIS, Ad. & Ang., n. s.

H. *testa depresso-conoidali, late et profunde umbilicata, rufa, fascia pallida transversa prope suturas ornata; spira valde depressa; anfractibus* 5, *convexiusculis, rugoso-granulosis, ad suturas corrugatis, anfractu ultimo ad peripheriam subangu-*

lato; apertura lunato-ovata, margine columellari subreflexo umbilicum partim tegente.

Long. 5½ lin., lat. 10 lin.

Hab. Port Lincoln, under dead logs (*Coll. Angas.*).

This handsome species is of a rich rufous brown, adorned with a pale band near the sutures. It seems to combine the characters of *H. lincolnensis* and *H. cassandra*.

9. Helix (Hadra) flindersi, Ad. & Ang., n. s.

H. *testa globoso-conoidali, tenuicula, mediocriter umbilicata, fusco-albida; anfractibus* 4½, *convexiusculis, rugoso-strigillatis, ultimo magno inflato; apertura lunato-ovata, labio callo umbilicum partim tegente.*

Long. 7 lin., lat. 7 lin.

Hab. Tillowie, near western slopes of Flinders Range (*Coll. Angas.*).

This remarkably compact and globose species, of which only two specimens have hitherto been found, is characterized by the rugose striæ of the whorls and by its conoidal spire.

10. Helix (Angasella) cyrtopleura, Pfr.

This strongly plicate, flattened, and widely umbilicated species belongs to a group of which it appears to be the only hitherto known representative. It somewhat resembles *H. plicaria* of Teneriffe in the character of its sculpture; but the outer lip is narrower and less expanded, and the umbilicus deep and wide.

Mr. Arthur Adams has separated this species as belonging to a peculiar group, for which he has proposed the name of *Angasella*.

From the plains near Lake Torrens.

11. Helix (Charopa) juliodea, Forbes.

This beautiful radiately sculptured and delicate species occurs also in New South Wales, where it is pretty generally distributed.

Found at Rapid Bay, near Cape Jervis, in the ravines of the high hills bordering on the coast.

12. Helix (Charopa) murrayana, Pfr.

A small, flattened, finely plicate species, with a large umbilicus.

From under stones and amongst grass in the ledges of the sandstone-cliffs of the Murray.

13. Helix (Thalassia) rustica, Pfr.

A small, vitreous, reddish horn-coloured species, with a very small deep umbilicus. This species is also found in other parts of Australia.

From Rapid Bay, in the same localities as *H. juliodea*.

14. Helix (Thalassia) subangulata, Ad. & Ang., n. s.

H. *testa orbiculato-conoidali, pertenui, pellucida, vitrea, pallide*

straminea, anguste umbilicata; anfractibus planis, tenuissime concentrice striatis, ultimo ad peripheriam subangulato; apertura perobliqua, lunato-ovali, latiore quam longa; labio acuto, breviter reflexo, umbilicum vix tegente.

Long. ½ lin., lat. 3 lin.

Hab. South Australia, under stones and logs (*Coll. Angas.*).

A small species, somewhat resembling *H. rustica*, Pfr., but with the last whorl subangular at the periphery, and with a narrow umbilicus, which is nearly concealed by a short reflexion of the columellar margin.

15. Bulimus (Liparus) angasianus, Pfr.

This fine *Bulimus*, which is rather more than an inch in height, having the body-whorls handsomely banded with white and brown, belongs to the Western Australian group *Liparus*, which is represented there by *B. melo*, *B. trilineatus*, *B. physoïdes*, and others.

My specimens were obtained from an open heath at Port Lincoln. I possess two dead specimens of *B. physoïdes* from Western Australia, and one of *B. meridionalis*, an East African species, which I obtained on the sea-beach near Port Adelaide. These must probably have been carried thither by the strong westerly winds and currents which prevail during the winter months.

16. Buliminus (Chondrula) adelaidæ, Ad. & Ang., n. s.

B. *testa turrita, pupiformi, in medio dilatata, umbilicata, albido-badia; anfractibus* 6, *convexis, longitudinaliter strigillatis; apertura rotundato-ovata; peritremate interrupto, albo, late reflexo; labio superne callo tuberculiformi albo munito.*

Long. 3 lin., lat. 1 lin.

Hab. South Australia, rocky places (*Coll. Angas.*).

A small pupa-like species having all the characters of *Chondrula*, which it appears to represent in South Australia, where it is generally distributed. In Western Australia there is an allied species, which we have elsewhere described as *Chondrula lepidula*.

17. Vertigo australis, Ad. & Ang., n. s.

V. *testa sinistrorsa, apice obtuso, rimato-umbilicata, pallide fusca; anfractibus* 7, *convexis, oblique valde striatis; apertura semiovata, peritremate incrassato et late dilatato, plica unica parietali et plica unica columellari munita.*

Long. 2 lin., lat. ¾ lin.

Hab. Rapid Bay, in crevices of rocks (*Coll. Angas.*).

A cylindrical and, for the genus, a large species, with the aperture furnished with but two plicæ.

18. Succinea strigata, Pfr.

A strongly plicate species with a papillary spire; pretty generally distributed throughout the country, in barren sandstone places.

19. Succinea arborea, Ad. & Ang., n. s.

S. *testa oblongo-ovata, spira quam apertura breviore, apice papilloso, alba, aureo-cornea, pellucida; anfractibus 3, valde convexis, longitudinaliter strigosis; apertura oblongo-ovata, labio callo tenui instructo; labro arcuato, simplici.*

Long. 4 lin., lat. 2 lin.

Hab. Burnside; hills near Adelaide; beneath bark of gum-trees (*Coll. Angas.*).

The habits of this species differ from those of *S. strigata*, Pfr., which are strictly terrestrial, the animals making their appearance after rain, and spreading over the hills in considerable numbers. Our species, on the contrary, shelters itself beneath the loose bark of the *Eucalypti*.

20. Blanfordia striatula, Menke.

This species of *Blanfordia* is the only example of an operculate land-shell that I have met with in South Australia. The same species is found in Tasmania.

From the hills near Adelaide.

4. Descriptions of Fifteen New Species of Land-Shells, from the Collection of H. Cuming, Esq. By Dr. Louis Pfeiffer.

1. Helix labuanensis, Pfr. *T. imperforata, conoideo-depressa, tenuis, carinata, striatula et liris minutis elevatis prope suturam distinctioribus cincta, cornea; spira concaviusculo-conoidea, apice acutiuscula; sutura marginata; anfr. 7, subplani, lente accrescentes, ultimus non descendens, acutissime carinatus, basi parum convexus; apertura obliqua, depresse securiformis; perist. simplex, rectum, margine supero brevi, antrorsum arcuato, basali a carina recedente, leviter arcuato, ad insertionem subcalloso.*

Diam. maj. 16½, min. 15, alt. 6 mill.

Hab. In insula Labuan (*Mr. Hugh Low*).

2. Helix hugonis, Pfr. (182 *a*). *T. sinistrorsa, clause perforata, turbinata, solida, undique conferte et subargute granulato-striata, superne fuscula; spira conoidea, vertice obtusulo; anfr. 8, lente accrescentes, convexiusculi, supra suturam flavescentes, ultimus compresse carinatus, infra carinam inflatus, castaneus; apertura obliqua, irregulariter angulato-lunaris, intus margaritacea; perist. subsimplex, margine supero brevi, basali perarcuato, versus perforationem subincrassato et leviter dilatato.*

Diam. maj. 38, min. 35, alt. 21–22 mill.

Hab. In insula Labuan (*Mr. H. Low*).

3. Helix ceroconus, Pfr. (194 *a*). *T. subperforata, conica, tenuiuscula, striatula, cerea; spira convexiusculo-conica, vertice obtusulo; sutura filomarginata; anfr. 6–6½, convexiusculi, lente*

accrescentes, ultimus convexior, non descendens, peripheria subacute carinatus; apertura vix obliqua, angulato-lunaris; perist. simplex, rectum, marginibus distantibus, supero brevi, basali leviter arcuato, versus insertionem sensim dilatato, reflexiusculo.

Diam. maj. 8½, min. 8, alt. 5½ mill.

Hab. In insula Labuan (*Mr. H. Low*).

4. HELIX JUCUNDA, Pfr. (263 *a*). *T. subclause perforata, conoideo-depressa, tenuis, sub lente conferte striata, nitida, fusco-cornea; spira breviter conoideo-elevata, vertice subtili; anfr. 6½, convexiusculi, lente accrescentes, ultimus non descendens, peripheria rotundatus, basi medio impressus; apertura vix obliqua, irregulariter lunaris, intus submargaritacea; perist. simplex, rectum, marginibus distantibus, dextro regulariter arcuato, columellari declivi, parum arcuato, ad insertionem breviter reflexo.*

Diam. maj. 17, min. 15½, alt. 9 mill.

Hab. In insula Labuan (*Mr. H. Low*).

5. HELIX DURA, Pfr. (387 *a*). *T. perforata, depressa, solida, carinata, superne subconferte plicato-striata, nitidula, fusco-isabellina; spira brevissime conoidea, vertice minuto obtusulo; sutura lineuris, anguste marginata; anfr. 5½, vix convexiusculi, lente accrescentes, ultimus non descendens, peripheria compresse et acute carinatus, subtus modice convexus, leviter radiato-striatus; apertura obliqua, depresse subrhombeo-lunaris; perist. rectum, margine supero tenui, basali a carina subito recedente, quasi rostram formante, tum usque ad perforationem leviter incrassato.*

Diam. maj. 34, min. 30, alt. 11 mill.

Hab. Waigiou Island (*Mr. Wallace*).

6. HELIX NIGROFASCIATA, Pfr. (1655 *a*). *T. anguste umbilicata, globoso-trochiformis, solidula, oblique regulariter striata, lineisque impressis antrorsum descendentibus dense decussata, lutea, fasciis 2 latis nigris et interdum cinnamomea infra illas cincta; spira turbinata, vertice acutiusculo; anfr. 4, convexi, ultimus inflatus, antice vix descendens, subtus spiraliter leviter striatus; apertura obliqua, rotundato-lunaris, intus alba, nigro fasciata; perist. album, marginibus convergentibus, dextro anguste expanso et reflexiusculo, columellari late reflexo, supra umbilicum fornicatim dilatato.*

Diam. maj. 19, min. 17, alt. 13 mill.

Hab. Admiralty Islands.

7. HELIX LATIZONA, Pfr. (1912 *a*). *T. mediocriter umbilicata, depressa, tenuiuscula, striatula, vix nitidula, fusca, zona latiuscula alba ad suturam notata; spira subplana; anfr. 4½, superi vix convexiusculi, ultimus rotundatus, superne antice subsulcatus, deflexus, subtus constrictus; apertura obliqua, rotundato-ovalis; perist. undique sublate expansum, marginibus convergentibus, columellari tuberculo oblongo-nodiformi intus munito.*

Diam. maj. 26½, min. 21, alt. 11 mill.

Hab. In insula Ceram (*Mr. Wallace*).

8. Bulimus dohrni, Pfr. (133 *a*). *T. imperforata, oblongo-conica, solida, lævigata, sulphurea; spira elongata, subregulariter conica, varicibus nigro-castaneis 1–2 notata, apice obtusulo; anfr. 7, vix convexiusculi, ultimus ⅓ longitudinis paulo superans, basi rotundatus, infra medium fascia lata livida vel virescente notatus; apertura parum obliqua, parvula, subrhombeo-ovalis; columella brevis, superne subplicata; perist. vix expansum, crassum, lacteum, striga castanea cinctum, marginibus callo crasso albo intrante junctis.*

Long. 45, diam. 21 mill. Ap. 16 mill. longa, 9½ lata.
Hab. Cochin-China.

9. Bulimus recedens, Pfr. (252 *a*). *T. compresse umbilicata, ovato-subfusiformis, tenuis, lævigata, pallide flavida, strigis undulatis subinterruptis fuscis picta; spira subexacte conica, apice acuta; anfr. 6, planiusculi, ultimus spiram superans, basi recedens, vix attenuatus; columella inflata, torta; apertura vix obliqua, oblongo-ovalis, superne angulata; perist. tenue, albidum, margine dextro latiuscule expanso, columellari reflexo, superne dilatato.*

Long. 27, diam. 12 mill.
Hab. Mozobamba.

10. Pupa soluta, Pfr. *T. profunde rimata, elongato-conica, tenuis, levissime striatula, pellucida, fusco-cornea; spira ovato-conica, vertice acutiusculo; anfr. 9, convexiusculi, ultimus antice solutus, horizontaliter productus, basi compressus; apertura basi axin excedens, truncato-ovalis, lamellis 6 elongatis fere clausa, 1 parietali et suprema palatali validioribus, marginem attingentibus, secunda palatali, 1 basali et 2 columellaribus profundioribus; perist. continuum, tenue, breviter expansum, margine supero libero, strictiusculo.*

Long. 8, diam. anfr. penultimi 3 mill.
Locality unknown; perhaps of a new genus, allied to *Tomigeres*.

11. Succinea cochinchinensis, Pfr. (14 *a*). *T. depresse ovata, tenuis, ruguloso-striata, pellucida, albido-cornea; spira parvula, subpapillata; anfr. 2½, ultimus magnus, obliquus, basi subcompressus; columella filaris, callosa, subtorta; apertura obliqua, anguloso-ovalis, intus submargaritacea, antice non incumbens; perist simplex, margine dextro subflexuoso.*

Diam. maj. 11 min. 6⅔, alt. 4½ mill. Apertura 10 mill. longa.
Hab. Cochin-China.

12. Pterocyclos labuanensis, Pfr. (1 *a*). *T. late umbilicata, subdiscoidea, solida, subtilissime striatula, sordide flavida unicolor vel in anfract. superioribus castaneo distanter flammulata; spira vix elevata, vertice corneo submucronato; anfr. 4½, convexiusculi, rapide accrescentes, ultimus subdepresse rotundatus, non descendens; apertura fere diagonalis, circularis; perist. duplex; internum porrectum, superne leviter incisum, externum latere sinistro*

reflexum, dextro sublate patens, superne cucullatim dilatatum et subdeflexum. Operc. planiusculum, calcareum, marginibus anfractuum infundibuliformiter elevatis.
Diam. maj. 18, min. 14, alt. 5 mill.
Hab. In insula Labuan (*Mr. H. Low*).

13. PTEROCYCLOS LOWIANUS, Pfr. (1 *b*). *T. late umbilicata, subdiscoidea, tenuiuscula, subtiliter striatula, sericina, fulva, flammis saturate castaneis amœne picta; spira planiuscula, vertice submucronato; anfr. 4½, convexi, regulariter accrescentes, ultimus teres, antice paululum descendens; apertura diagonalis, circularis; perist. duplex; internum brevissime porrectum, juxta anfr. contiguum vix sinuatum; externum latere sinistro angustissimum, dextro breviter patens, superne dilatatum et protractum, vix concavum. Operc. præcedentis.*
Diam. maj. 15½, min. 12½, alt. 5½ mill.
Hab. In insula Labuan (*Mr. H. Low*).

14. PUPINA MERIDIONALIS, Pfr. (4 *a*). *T. oblonga, tenuiuscula, levissime striatula, subpellucida, succineo-cornea; spira sensim in conum acutiusculum attenuata; sutura levis, simplex; anfr. 7, summi convexiusculi, sequentes planiores, penultimus longus, ultimus antice subascendens, basi axin excedens; apertura obliqua, circularis, bicanaliculata; callus parietalis arcuatus, latere dextro in linguam triangularem, sinistro in linguam latam transverse truncatam abiens; perist. subincrassatum, breviter expansum, cum lingua sinistra directione parallela recedens.*
Long. 13, diam. 6 mill.
Hab. North Australia.

15. PUPINA PLANILABRIS, Pfr. (4 *b*). *T. subrimata, oblongo-conica, tenuiuscula, sub lente striatula, subsericea, carneo-fuscula; spira conica, apice acutiuscula; sutura simplex; anfr. 7, convexiusculi, penultimus longus, latere aperturæ subplanulatus, ultimus brevis, descendens; apertura subverticalis, circularis, linearitér bicanaliculata; callus parietalis planus, subsolutus, latere dextro breviter ligulatus, sinistro infra medium oblique resectus; perist. plane expansum, utrinque extus cum linguis junctum et infra rimam umbilicalem cristulam e canali punctiformi exeuntem formans.*
Long. 12½, diam. 5⅔ mill.
Hab. North Australia.

5. DESCRIPTIONS OF TEN NEW SPECIES OF LAND-SHELLS, FROM THE COLLECTION OF GEORGE FRENCH ANGAS, ESQ. BY DR. LOUIS PFEIFFER.

1. HELIX INCLINATA, Pfr. (387 *b*). *T. subclause perforata, conoideo-depressa, solida, carinata, superne conferte rugoso-striata,*

nitidula, pallide fusca; spira regulariter conoidea, vertice minuto obtusulo; sutura marginata, carina subprominula; anfr. 6, vix convexiusculi, lente accrescentes, ultimus non descendens, acute carinatus, basi convexus, substriatus, nitidior, medio pallidior, impressus; apertura fere diagonalis, angulato-lunaris, intus margaritacea; perist. rectum, margine supero simplici, basali regulariter arcuato, versus perforationem subincrassato, eam lamina triangulari claudente.

Diam. maj. 30, min. 26½, alt. 14 mill.

Hab. Louisiade Group, New Caledonia.

2. HELIX LINCOLNIENSIS, Pfr. (561 *a*). *T. umbilicata, subconoideo-depressa, tenuis, superne conferte rugoso-striata et subtilissime granulata, pellucida, unicolor castanea; spira subconoideo-elevata, vertice obtusulo; anfr. 5, convexiusculi, ultimus subdepresso-rotundatus, antice non descendens, subtus circa umbilicum angustum leviter radiato-striatus; apertura obliqua, rotundato-lunaris; perist. simplex, rectum, marginibus convergentibus, columellari superne in laminam reflexam fuscam dilatato.*

Diam. maj. 22, min. 19, alt. 12 mill.

Hab. Port Lincoln.

3. HELIX MURRAYANA, Pfr. (654 *a*). *T. umbilicata, depressa, tenuiuscula, confertissime filoso-plicata, vix nitidula, fusca; spira plana; anfr. 5, convexiusculi, regulariter accrescentes, ultimus rotundatus, non descendens; umbilicus ¼ diametri subæquans; apertura parum obliqua, rotundato-lunaris; perist. simplex, rectum, marginibus conniventibus, columellari juxta umbilicum vix dilatato.*

Diam. maj. 7, min. 6, alt. 3 mill.

Hab. Murray Cliffs, South Australia.

4. HELIX CASSANDRA, Pfr. (1080 *b*). *T. mediocriter umbilicata, globoso-depressa, tenuis, striatula et minutissime granulata, parum nitens, superne pallide isabellina, fasciis nonnullis saturatioribus obsolete notata, subtus albida; spira breviter conoideo-elevata, vertice minuto; anfr. 5, regulariter accrescentes, superi vix convexiusculi, ultimus inflatus, antice vix deflexus; apertura parum obliqua, rotundato-lunaris, intus submargaritacea; perist. simplex, tenue, margine dextro recto, basali reflexiusculo, juxta umbilicum in laminam triangularem fornicatam dilatato.*

Diam. maj. 26, min. 22, alt. 15 mill.

Hab. Murray Cliffs, South Australia.

5. HELIX ZENOBIA, Pfr. (1131 *a*). *T. sublate umbilicata, conoideo-lenticularis, solida, superne ruditer et conferte plicata, acute carinata, rufa; spira breviter conoidea, apice obtusa; sutura submarginata; anfr. 5½, convexiusculi, lente accrescentes, ultimus non descendens, supra carinam convexior, basi leviter radiato-striatus, sensim in umbilicum transiens; apertura perobliqua,*

subrhombeo-lunaris; perist. rectum, marginibus subconvergentibus, supero antrorsum arcuato, basali incrassata.
Diam. maj. 22, min. 20, alt. 9 mill.
Hab. New Georgia.

6. HELIX EVANDALEANA, Pfr. (1167 *b*). *T. subanguste umbilicata, depressa, solidula, carinata, superne rugoso-striata et granulata, pilis brevibus obsita, subpellucida, fusca; spira parum elevata, vertice obtuso; sutura profunda, carina magis minusve prominente marginata; anfr.* 4, *convexi, ultimus supra medium carina funiformi et interdum angulo secundo obsoletiore circumdatus, basi levius striatus, plano-convexus; apertura obliqua, late lunaris; perist. simplex, marginibus vix convergentibus, dextro recto, basali reflexiusculo, juxta umbilicum subdilatato.*
Diam. maj. 17½, min. 15, alt. 9 mill.
Hab. Evandale, South Australia.

7. HELIX PERINFLATA, Pfr. (1601 *a*). *T. umbilicata, globosa, solida, striis incrementi rugosis et lineis impressis antrorsum descendentibus decussata, isabellino-albida; spira convexo-conoidea, apice obtusa; anfr.* 4½, *ultimus magnus, ventrosus, subtus perinflatus, striis spiralibus obsolete sculptus, antice deflexus; apertura diagonalis, lunari-rotundata; perist. breviter expansum, margine columellari supra umbilicum angustum fornicatim dilatato.*
Diam. maj. 23½, min. 20, alt. 20 mill.
Hab. McDonnell Ranges, Central Australia; found by Mr. Waterhouse on Stuart's Expedition.

8. HELIX CARCHARIAS, Pfr. (1606 *a*). *T. subobtecte perforata, conoideo-globosa, solidula, sub lente minutissime granulata, carnea; spira conoidea, vertice læviguto obtusulo; anfr.* 5, *convexiusculi, superi irregulariter tuberculato-plicati, ultimus ventrosus, superne levius plicatus, subtus radiato-striatus, albidus, antice profunde deflexus; apertura diagonalis, subcircularis; perist. simplex, tenue, anguste expansum, marginibus approximatis, columellari fornicatim supra umbilicum late reflexo.*
Diam. maj. 17–19½, min. 13½–16, alt. 10½–14 mill.
Hab. Sharks' Bay, N. W. Australia.

9. HELIX CURTISIANA, Pfr. (1681 *a*). *T. anguste umbilicata, conoideo-semiglobosa, solida, striata, castanea; spira conoideo-convexa, superne albida, vertice obtusulo; sutura albo filosa; anfr.* 6, *lente accrescentes, ultimus magnus, convexus, supra medium subangulatus, basi planiusculus, antice descendens; apertura fere diagonalis, rotundato-lunaris; perist. vix incrassatum, anguste expansum, margine columellari superne triangulatim dilatato.*
Diam. maj. 29, min. 25, alt. 17 mill.
Hab. Port Curtis, N. E. Australia.

10. BULIMUS ANGASIANUS, Pfr. (773 *a*). *T. imperforata, ovato-conica, tenuis, plicis longitudinalibus confertis, sulcis spiralibus*

interruptis sculpta, castanea, fasciis 2 albis ornata; spira convexo-conica, apice obtusulo alba; anfr. 5, modice convexi, ultimus spiram superans, infra medium leviter striatus, basi rotundatus; apertura parum obliqua, angulato-ovalis, intus margaritacea, albo fasciata; perist. simplex, rectum, margine dextro antrorsum subcurvato, columellari albo-calloso, arcuato, intrante.

Long. 25½, diam. 14 mill.

Hab. Port Lincoln, South Australia.

6. On the Breeding of the Green Sandpiper (Helodromas ochropus). By Alfred Newton, M.A., F.L.S., F.Z.S.

Ornithologists are aware of the very different positions often chosen for their nests by birds of the same species. Thus Eagles may be found sometimes building their eyries upon trees, at others on cliffs, and again sometimes absolutely upon the flat ground. The same may be said of some species of Falcons and of some Herons. Certain Crows also and the Stock-Dove (*Columba œnas*) exhibit a like disparity of habit. Even among the members of the Gallinaceous order a similar diversity is occasionally, though rarely, to be observed. I have been told, on authority I cannot question, of a common Pheasant (*Phasianus colchicus*) and of a Capercally (*Tetrao urogallus*) each choosing a nest in a tree wherein to lay its eggs. Instances of the common Wild Duck (*Anas boschas*) breeding in hollow stumps of trees are very frequent; and with the Ducks of the genus *Aix* this seems to be the normal mode of nidification. But, excepting in the last case, this peculiarity in the selection of a site for the nest seems to result from the particular fancy (or instinct, it may be) of the individual; and in that exceptional case the general habits of the birds are so essentially arboreal that we need not wonder at the fact of their using trees for their nurseries as well as for their usual places of lodging. The only instances parallel to the one I am going to adduce are, so far as I can call to mind, those of the Golden-eye (*Clangula glaucion*), the Goosander (*Mergus serrator*), and the Smew (*Mergus albellus*). Each of these three birds departs from the manner of nidification which obtains among its brethren, just as I shall show that the Green Sandpiper (*Helodromas ochropus**) does.

Though I do not pretend to lay before you any novel facts this evening, yet it will be, I think, admitted that hitherto we have had in England but little positive information on the mode of breeding of the Green Sandpiper; such as it is, however, I will proceed to notice it. First, I must say that I think the story of the nest of this bird "by the side of a clay-pit" in Norfolk, as told in Mr. Yarrell's 'British Birds' (vol. ii. p. 529) and in Mr. Lubbock's

* The osteology of the *Tringa ochropus*, Linn., presents such a marked deviation from that of the other *Totani* which I have examined, that I do not hesitate in this case to follow Dr. Kaup in considering it the type of a distinct genus.

'Fauna of Norfolk' (p. 75), can hardly be relied on—not, of course, that there is the slightest reason to doubt the implicit good faith of Sir Thomas Beevor, on whose authority it appears to rest. Next there is the statement contributed to the last edition of Mr. Hewitson's 'Eggs of British Birds' (ed. 3. vol. ii. p. 334*) by Mr. Tristram, to the effect that he found the species breeding near sluggish streams or mountain tarns between Bodö and Quickjock in Lapland. Now this particular district has since been visited by three other excellent observers, to no one of whom did the Green Sandpiper reveal itself. I therefore hope I may be pardoned for suggesting the possibility of a mistake in my friend's assertion.

In the 'Naumannia' for 1851 (vol. i. part 2, p. 50), Herr Pässler mentions that he had, through his friend the Oberförster Wiese, obtained an egg of *Totanus glareola*, with the remark that this species of Sandpiper always "nests upon a tree;" but in the same periodical for 1852 (vol. ii. part 1, p. 95) he states that Baron von Homeyer had informed him that the egg in question was not that of *T. glareola*, but of *T. ochropus*, and adds that during his stay at Haff he had seen many nesting-places of this latter species; they were on the borders of "*Elsenbrüche*" [*quære*, swamps of the Service-tree (*Pyrus domestica*)?], in the middle of the forest, where the trees stand upon hillocks. In the 'Journal für Ornithologie' for 1855 (vol. iii. p. 514), the above-mentioned Herr Wiese, writing on the Ornithology of Pomerania, especially in the district of Cöslin, says that he had first heard from an old sportsman, who knew the peculiarities of all the forest-animals, that the *Totanus ochropus* nested in old Thrushes'-nests, which information, he remarks, "I naturally did not believe;" but he states that some years after, in 1845, he obtained from the same man four fine eggs of a bird of this species, which for many years had been wont to nestle in an old beech tree. Still doubtful on the subject, the following spring he himself found a nest of the bird on a pine which had a fork about five-and-twenty or thirty feet high. "Joyfully," he says, "I climbed the tree, and found in that fork four eggs on a simple bed of old moss." He goes on to say that in the spring of 1853 he again obtained four eggs of the same species; and in the spring of 1854 (the year he was writing) he found a nest placed in the old nest of a Song-Thrush, out of which the shed buds of the beech had not so much as been removed. There were four eggs, which were hard sat upon on the 25th of May.

In the 'Naumannia' for 1856 (vol. vi. p. 34), in an account of an excursion in Western Pomerania ("*Vorpommern*"), Dr. Altum states that *Totanus ochropus* returns annually to its old nesting-places, these being Misseltoe-Thrushes' nests, whose remains were still to be seen, often some hundred yards distant from the nearest pool, and their height fifteen feet or more from the ground. The same journal for 1857 contains a valuable series of observations on the birds of the same district by Herr W. Hintz, in which the author says (vol. vii. part 1, p. 14) that on the 6th of May, 1855, he found three eggs of this bird on an "*Else*" [quære, *Pyrus do-*

mestica?] in an old Dove's nest, as he thinks, though he states it might have been that of a Jay. Formerly, he proceeds to remark, he had only observed this Sandpiper to use old nests of *Turdus musicus*, excepting once, when he found some young ones, only a few days old, hard by a river-bank on a layer of pine-needles on an "*Else*"-stub.

Soon after the publication of this last piece of intelligence, appeared that part of Herr Bädeker's 'Eier der Europäischen Vögel,' wherein (fol. xxx. no. 5) *Helodromas ochropus* was treated of, and a concise summary of the foregoing accounts was given. This was remarked upon by the writer of an article in 'The Ibis' for 1859 (vol. i. p. 405), and thus the curious facts which I have above detailed were made generally known, for the first time I believe, to English readers. In 1860 a short recapitulation of them was also published by my friend Dr. Baldamus, in the continuation of Naumann's celebrated 'Vögel Deutschlands' (vol. xiii. p. 241). Towards the close of the same year also that excellent observer who veils his name under the signature of "An Old Bushman" contributed a series of articles to 'The Field' newspaper, in which he described his own experience of the Green Sandpiper's way of nesting in Sweden. The natural-history editor of that paper, not knowing what had been already written, exhibited some signs of scepticism on the subject, whereupon his correspondent reiterated his statement, saying (Field, No. 411, Nov. 10, 1860, p. 393) that "there is no doubt about the matter," and adding that he "never took the nest on the ground."

I have now only to read to you a portion of a letter, dated November 27, 1861, which I received from my friend Pastor Theobald, of Copenhagen. He says as follows:—

"The nidification of *Totanus ochropus* is so remarkable that I do not fear to trouble you with the history the Forester Hintz [whom I have mentioned above] has given me. He writes:—'This year I succeeded in finding the nest of *Totanus ochropus*. On the 9th of May I took four eggs of this bird; they were found in an old nest of *Turdus musicus*, and seemed to have been incubated about three days. The very same day there were brought to me four other eggs of this bird, also found in a Thrush's nest. * * * The 10th of May there was shown to me a nest, thirty feet high, on an old birch, the bird having chosen an old decayed nest of a Squirrel. This nest was the highest I have ever seen. Three young ones had just been hatched; in the fourth egg the bird was about to break the shell. One jumped down and concealed itself on the edge of a water-pool. The 11th of May a nest with four fresh eggs was found, but they did not come into my hands; this was in an old Pigeon's nest on a *Pinus rubra*, and full of dry pine-leaves. The 20th of May two eggs, almost burst by the young, were found in an old Thrush's nest, the two missing birds having most likely already left the nest. The 22nd of May four young ones, apparently but a few hours old, were found in the old nest of a *Lanius collurio*, in a juniper three feet high. The 24th of May four young ones were found in the hole of a *Populus tremula* thrown down by the wind. The year before *Muscicapa luctuosa* had its

nest in the trunk as it lay on the ground; this year *Totanus ochropus* had chosen the same opening. When I approached the trunk, the young ones, perhaps four-and-twenty hours old, jumped away and hid themselves in the grass among the branches. All these nests were near the water,—two on the edge of a rivulet, the others on wet morasses, the distance from the water being at most six feet.'"

I have the pleasure of exhibiting to you a small series of a score of the eggs of this bird, as well as three nests. The latter were sent me by Mr. H. W. Wheelwright, and were obtained by him this year in Sweden. They are so ragged and dilapidated that, as is often the case with ancient ruins, it is not easy to say of what race the builders were. From one of them, five-and-twenty feet up in a fir tree, the mother was killed on the 28th of May, and I produce her skin. Three of the sets of eggs belonged to these nests; a fourth set was the contents of Forester Hintz's nest of the 9th of May 1861, mentioned in his interesting letter. This I owe to Mr. Theobald and some other friends in Copenhagen. The remaining four eggs are odd ones obtained by Mr. Wolley and myself from Dr. Kjærbölling.

APPENDIX.

LIST OF ADDITIONS TO THE SOCIETY'S MENAGERIE

DURING THE YEAR

1863.

Jan. 1. 1 pair of Demoiselle Cranes. *Anthropoïdes virgo* (Linn.). Purchased.
1 ♀ Mandarin Duck. *Aix galericulata* (Linn.). Purchased.
3 American Barn-Owls. *Strix pratincola*, Bonap. Presented by Dr. Slack, of Philadelphia, U. S.
1 Common Barn-Owl. *Strix flammea*, Linn. Purchased.
2. 1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Deposited.
7. 1 Crowned Harpyhaliaëtus. *Harpyhaliaëtus coronatus* (Temm.). Deposited by E. W. Goodlake, Esq., C. M. Z. S. (see Feb. 1, 1863).
1 Virginian Owl. *Bubo virginianus* (Gmel.). Deposited by E. W. Goodlake, Esq., C. M. Z. S.
1 Azara's Agouti. *Dasyprocta azaræ*, Licht. Deposited by E. W. Goodlake, Esq., C. M. Z. S.
1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by Dr. Rogers.
8. A collection of Salmon-Ova. *Salmo salar*, Linn. Deposited.
A collection of Trout-Ova. *Salmo fario*, Linn. Deposited.
9. 1 Bonnet Monkey. *Macacus radiatus* (Shaw). Presented by G. G. Harvey, Esq.
10. 1 Yellow-faced Amazon. *Chrysotis amazonica* (Linn.). Purchased.
1 Green-cheeked Amazon. *Chrysotis viridigenalis*, Cass. Purchased.
1 Quica Opossum. *Didelphis quica*, Temm. Purchased.
1 Brown Coati. *Nasua fusca*, Desm. Purchased.
1 Malabar Parrakeet. *Palæornis columboides*, Vig. Purchased.
12. 2 Syrian Cats. *Felis maniculata*, Rüpp. Presented by H. R. H. the Prince of Wales.
1 Cuvier's Gazelle. *Gazella cuvierii*, Ogilby. Purchased.
10 Pintailed Sandgrouse. *Pterocles alchata* (Linn.). In exchange.
1 Great Grey Shrike. *Lanius meridionalis* (Temm.). Purchased.
15. 1 Grey Ichneumon. *Herpestes griseus* (Geoff.). Deposited.

Jan. 17. 1 Cinereous Sea-Eagle. *Haliaëtus albicilla* (Linn.). Presented by the Marquis of Salisbury.
1 Ocelot. *Felis pardalis*, Linn. Presented by E. J. Longton, Esq.
20. 2 Golden Agoutis. *Dasyprocta aguti* (Linn.). Born.
50 Salmon. *Salmo salar*, Linn. Hatched.
24. 1 Vinaceous Turtledove. *Turtur vinaceus* (Gmel.). Hatched.
25. 2 Lions. *Felis leo*, Linn. Born.
26. 1 Female Nylghaie. *Portax picta* (Pall.). Purchased.
27. 1300 Salmon. *Salmo salar*, Linn. Hatched.
200 Trout. *Salmo fario*, Linn. Hatched.
1 Double-ringed Turtledove. *Turtur bitorquatus* (Temm.). In exchange.
2 Pied Grallinas. *Grallina australis*, Gray. Presented by Dr. Mueller, C. M. Z. S.
1 Black-backed Porphyrio. *Porphyrio melanotus*, Temm. Presented by Dr. Mueller, C. M. Z. S.
2 Sombre Gallinules. *Gallinula tenebrosa*, Gould. Presented by Dr. Mueller, C. M. Z. S.
2 Bronze-winged Pigeons. *Phaps chalcoptera* (Lath.). Presented by Dr. Mueller, C. M. Z. S.
2 Australian Coots. *Fulica australis*, Gould. Presented by Dr. Mueller, C. M. Z. S.
3 Van Diemen's Land Quails. *Synœcus diemenensis*, Gould. Presented by Dr. Mueller, C. M. Z. S.
1 Pectoral Quail. *Coturnix pectoralis*, Gould. Presented by Dr. Mueller, C. M. Z. S.
2 Gray's Jerboa Kangaroos. *Bettongia grayi* (Gould). Purchased.
28. 2 Roseate Cockatoos. *Cacatua roseicapilla*, Vieill. Deposited.
30. 1 Common Badger. *Meles taxus* (Schreb.). Presented by Mr. Grey.
31. 1 Ring-necked Parrakeet. *Palæornis torquata* (Linn.). Presented by Mrs. James Part.

Feb. 1. 1 Crowned Harpyhaliaëtus. *Harpyhaliaëtus coronatus* (Temm.). Presented by E. W. Goodlake, Esq., C. M. Z. S. (see Jan. 7, 1863).
2. 1 Striped Hyæna. *Hyæna striata*, Zimm. Presented by John Edw. Woods, Esq.
2 Indian Pythons. *Python molurus* (Linn.). Purchased.
3. 1 Capybara. *Hydrochœrus capybara*, Erxl. Purchased.
6. 1 Common Magpie. *Pica caudata*, Flem. Presented by Mrs. Newbon.
7. 12 Gold Carp. *Cyprinus auratus*, Linn. Purchased.
9. 1 ♀ Impeyan Pheasant. *Lophophorus impeyanus* (Lath.). In exchange.
10. 16 Bivalves. Purchased.
11. 2 Australian Hapalotes. *Hapalotis mitchellii* (Ogilby). Born.
9 Water-Vipers. *Cenchris piscivorus*, Gray. Born.
12. 2 Penang Squirrels. *Sciurus vittatus*, Raffl. Deposited.
1 pair of Gold Pheasants. *Thaumalea picta* (Linn.). Purchased.
13. 2 Starfish. Purchased.
14. 5 Barbary Partridges. *Caccabis rufa* (Linn.). Deposited.
2 Prairie-Grouse. *Tetrao cupido*, Linn. Deposited.
2 Bronze-winged Pigeons. *Phaps chalcoptera* (Lath.). Deposited.
2 Passenger Pigeons. *Ectopistes migratorius* (Linn.). Deposited.
4 Surat Turtledoves. *Turtur chinensis* (Scop.). Deposited.
4 Green-winged Pigeons. *Chalcophaps indica* (Lath.). Deposited.

Feb. 14. 1 West-Indian Dove. Deposited.
16. 1 Antillean Boa from Santa Lucia. *Boa diviniloqua*, Dum. et Bibr. Purchased.
18. 2 Fat Dormice from Poland. *Myoxus glis*, Schreb. Purchased.
A collection of "Great Lake Trout"-Spawn, from Switzerland. Deposited.
20. 1 Zebu. *Bos indicus*, Linn., var. Presented by Capt. Richardson.
1 Black-backed Kaleege. *Gallophasis melanotus* (Blyth).
1 Common Bunting. *Emberiza miliaria*, Linn. Purchased.
21. 50 Salmon-Ova. *Salmo salar*, Linn. Presented by F. Vanzeller, Esq.
1 Little Grebe. *Podiceps minor*, Linn. Purchased.
22. 1 Arabian Baboon. *Cynocephalus hamadryas* (Linn.). Born. Dead.
23. 1 Roseate Cockatoo. *Cacatua roseicapilla* (Vieill.). Deposited.
24. 1 Pied Hornbill. *Buceros pica*, Scop. Purchased.
1 Ichneumon. *Herpestes*. Purchased.
26. 1 Leopard. *Felis leopardus*, Linn. Deposited.
1 Muntjac Deer. *Cervulus muntjac* (Zimm.). Deposited.
1 Grey Parrot. *Psittacus erythacus*, Linn. Deposited.
1 Indian Porphyrio. *Porphyrio indica*, Horsf. Purchased.
1 Sykes's Monkey. *Cercopithecus albogularis*, Sykes. Purchased.
28. 1 Andaman Wild Boar. *Sus andamensis*, Blyth. Purchased.
6000 "Great Lake Trout"-Ova. *Salmo ferox*, Jard. & Selb. Deposited.
6000 Salmon-Trout-Ova. *Salmo fario*, Linn. Deposited.
6000 Charr-Ova. Deposited.

Mar. 3. 2 Iguanas. Presented by Capt. Abbott.
1 piece of Serpula. Purchased.
4. 1 Bat.
1 Herring-Gull. *Larus argentatus*, Brünn. Presented by Dr. Günther, F.Z.S.
5. 2 Sea-Peaches. *Codium bursa*, from Jersey. Presented by J. H. W. Schröder, Esq., F.Z.S.
6. 1 Two-toed Sloth. *Bradypus didactylus*, Linn. Presented by H. Eldens, Esq.
1 Saker Falcon. *Falco sacer*, Schleg. Received in exchange.
7. 1 Brahmin Calf. *Bos indicus*, Linn., var. Born.
1 Common Bunting. *Emberiza miliaria*, Linn. Purchased.
9. 1 Lion. *Felis leo*, Linn. Born.
12. 1 Clouded Tiger. *Felis macrocelis*, Temm. Purchased.
2 Malayan Sun-Bears. *Helarctos malayanus*, Raffl. Purchased.
1 White-fronted Lemur. *Lemur albifrons*, Geoff. Purchased.
1 ♀ Sonnerat's Jungle-fowl. *Gallus sonneratii*, Temm. Purchased.
1 Cape Francolin. *Francolinus capensis*, Gmel. Purchased.
5 Starred Tortoises. *Testudo stellata*, Schw. Purchased.
14. 1 Crested Pigeon. *Ocyphaps lophotes* (Temm.). Purchased.
17. 1 Grey Ichneumon. *Herpestes griseus* (Geoff.). Presented by B. C. Bond, Esq.
1 Broad-nosed Eel. *Anguilla latirostris*, Yarr. Presented by A. Arcedeckne, Esq., F.Z.S.
18. 1 Mealy Green Parrot. *Chrysotis farinosa* (Bodd.). Deposited.
7 Common Hares. *Lepus timidus*, Linn. Purchased.
1 Common Wombat. *Phascolomys wombat*, Pér. et Les. Presented by the Acclimatization Society of Victoria.

Mar. 18. 1 Hairy-nosed Wombat. *Phascolomys lasiorhinus*, Gould. Presented by the Acclimatization Society of Victoria.
1 Black Wombat. *Phascolomys niger*, Gould. Presented by the Acclimatization Society of Victoria.
3 Piping Crows. *Gymnorhina leuconota*, Gould. Presented by Dr. Mueller, C. M. Z. S.
2 Australian Wild Ducks. *Anas superciliosa*, Gmel. Presented by Dr. Mueller, C. M. Z. S.
1 Black-backed Porphyrio. *Porphyrio melanotus*, Temm. Presented by Dr. Mueller, C. M. Z. S.
19. 1 Hybrid Phalanger. Between *Phalangista vulpina* (Shaw) and *P. fuliginosa*, Ogilby. Born.
1 Rose-crested Cockatoo. *Cacatua rosacea*, Vieill. Presented by R. Drummond, Esq.
21. 2 Common Otters. *Lutra vulgaris* (Linn.). Presented by the Rev. Aug. Morgan.
1 Common Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by H. Goodwyn, Esq.
22. 1 Common Porpoise. *Phocæna communis*, Less. Purchased.
24. 1 Little Grebe. *Podiceps minor*, Linn. Presented by the Rev. C. J. Lucas.
25. 1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by Mr. Constable.
26. 5 Bisons. *Bos americanus*, Gmel. Purchased.
1 Wedge-tailed Eagle. *Aquila audax* (Lath.). Presented by — Russell, Esq.
27. A collection of Madrepores. Purchased.
31. 1 Grey Ichneumon. *Herpestes griseus* (Geoff.). Presented by Mr. E. Carman.
A collection of Marine Animals. Purchased.
1 ♂ Horned Tragopan. *Ceriornis satyra* (Cuv.). Presented by the Baboo Rajendra Mullich.
2 ♀ Horned Tragopans. *Ceriornis satyra* (Cuv.). Presented by the Baboo Rajendra Mullich.
1 ♂ Peacock Pheasant. *Polyplectron chinquis*, Temm. Presented by the Baboo Rajendra Mullich.
12 Hardwick's Francolins. *Galloperdix lunulosa* (Valenc.). Presented by the Baboo Rajendra Mullich.
3 White-billed Hornbills. *Buceros albirostris*, Shaw. Presented by the Baboo Rajendra Mullich.
4 ♂ Impeyan Pheasants. *Lophophorus impeyanus* (Lath.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.
1 ♂ Pucras Pheasant. *Pucrasia macrolopha* (Less.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.
4 ♂ White-crested Kaleege. *Gallophasis albocristatus* (Vig.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.
1 Cheer Pheasant. *Catreus wallichii* (Hardw.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.
5 ♂ Horned Tragopans. *Ceriornis satyra* (Cuv.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.
1 ♀ Horned Tragopan. *Ceriornis satyra* (Cuv.). Deposited by J. J. Stone, Esq., and the Rev. W. Smythe.

Apr. 1. 2 Japanese Bears. *Ursus japonicus*, Schleg. Purchased.
4 Griffon Vultures. *Gyps fulvus* (Gmel.). Presented by Lord Londesborough.
1 Imperial Eagle. *Aquila heliaca*, Savig. Presented by Lord Londesborough.

Apr. 2. 2 Bonnet Monkeys. *Macacus radiatus* (Shaw). Presented by James Smith, Esq.
4. 1 Purple-capped Lory. *Lorius domicellus* (Linn.). Deposited by Mrs. Turnbull.
1 Scarlet Lory. *Eos indica* (Gmel.). Deposited by Mrs. Turnbull.
1 Blossom-headed Parrakeet. *Palæornis bengalensis* (Linn.). Deposited by Mrs. Turnbull.
6. 1 Ibex. *Capra ibex* (Linn.), hybrid. Born.
1 South American Monkey. *Cebus capucinus* (Linn.). Deposited by Mr. Greey.
1 Grison. *Grisonia vittata* (Schreb.). Presented by — Gayleard, Esq.
1 Brazilian Chameleon. *Polychrus marmoratus* (Linn.). Presented by Dr. Wucherer, C. M. Z. S.
1 Duméril's Water Tortoise. *Podocnemis dumeriliana*, Wagl. Presented by Dr. Wucherer, C. M. Z. S.
7. 1 Tuberculated Iguana. *Iguana tuberculata*, Laur. Presented by J. Marshall, Esq.
8. 1 Black-faced Kangaroo. *Macropus melanops*, Gould. Purchased.
1 Rabbit-eared Perameles. *Perameles lagotis*, Reid. Purchased.
2 Sooty Crows. *Strepera fuliginosa*, Gould. Purchased.
3 Leadbeater's Cockatoos. *Cacatua leadbeaterii* (Vig.). Deposited.
9. 1 Rose-crested Cockatoo. *Cacatua rosacea*, Vieill. Received in exchange.
10. 2 Summer Ducks. *Aix sponsa* (Linn.). Deposited.
11. 1 Great Kangaroo. *Macropus giganteus*, Shaw. Presented by T. Mackay, Esq.
1 Australian Snake. Presented by D. Murray, Esq.
12. 1 Bison. *Bos americanus*, Gmel. Born. Dead.
15. 1 Ka-Ka Parrot. *Nestor hypopolius* (Forst.). Purchased.
1 Cape Francolin. *Francolinus capensis*, Gmel. Received in exchange.
4 Sand-Lizards. *Lacerta agilis*, Linn. Presented by Rev. C. Wolley.
16. 1 ♀ Eland. *Oreas canna* (Pall.). Born.
1 Mule between Exmoor Pony and Common White Donkey. *Equus caballus*, Linn., var., and *Asinus vulgaris*, Gray, var. *albino*. Born.
1 Western Wapiti Deer. *Cervus canadensis*, Briss., var. *occidentalis*, H. Smith. Purchased.
17. 1 pair of Love-Bird Parrakeets. *Agapornis pullaria* (Linn.). Purchased.
2 Australian Lizards. *Grammatophora muricata* (Shaw). Purchased.
1 pair of Cereopsis Geese. *Cereopsis novæ-hollandiæ*, Lath. Received.
18. 1 Australian Crane. *Grus australasiana*, Gould. Received in exchange.
1 Australian Rail. *Rallus pectoralis*, Less. Received in exchange.
1 Kagu. *Rhinochetus jubatus*, Verr. et DesMurs. Presented by Dr. G. Bennett, F.Z.S.
1 Echidna. *Echidna hystrix*, Cuv. Purchased.
19. 1 Hog-Deer. *Cervus porcinus*, Zimm. Born. Dead.
20. 1 Mace's Sea-Eagle. *Haliaëtus macii* (Temm.) Presented by A. Grote, Esq., C.M.Z.S.
1 Common Peafowl. *Pavo cristatus*, Linn. Presented by A. Grote, Esq., C.M.Z.S.

Apr. 21. 1 African Hare. *Lepus mediterraneus*? Deposited by the Rev. Mr. Ogle.
1 Dingo. *Canis dingo*, Blumenb. Presented by J. Watts, Esq.
1 Four-horned Antelope. *Tetracerus quadricornis* (Blainv.). Presented by A. Grote, Esq., C.M.Z.S.
3 Black-backed Porphyrios. *Porphyrio melanotus*, Temm. Received in exchange.
23. 5 Australian Green-winged Doves. *Chalcophaps chrysochlora* (Wagl.). Received in exchange.
12 Sand-Lizards. *Lacerta agilis*, Linn. Presented by Rev. C. Wolley.
1 White's Tree-Frog. *Pelodryas cæruleus* (White). Purchased.
1 Ewing's Tree-Frog. *Hyla ewingii*, Dum. et Bibr. Purchased.
1 Tree-Frog. *Hyla citropus*, Dum. et Bibr. Purchased.
1 Péron's Tree-Frog. *Hyla peronii*, Dum. et Bibr. Purchased.
2 Krefft's Tree-Frog. *Hyla krefftii*, Günthr. Purchased.
1 Leaf-green Tree-Frog. *Hyla phyllochroa*, Günthr. Purchased.
24. 1 Violaceous Plantain-cutter. *Musophaga violacea*, Isert. Deposited by Dr. Gray, F.Z.S.
1 ♀ Brush-Turkey. *Talegallus lathami*, Gray. Deposited.
1 young Emu. *Dromæus novæ-hollandiæ*, Vieill. Deposited.
2 Whistling Eagles. *Haliastur sphenurus* (Vieill.). Deposited.
1 Dingo. *Canis dingo*, Blumenb. Deposited.
4 Yellow Sparrows. *Passer luteus* (Licht.). Purchased.
1 Yellow-cheeked Lemur. *Lemur xanthomystax*, Gray. Purchased.
6 Red-vented Bulbuls. *Pycnonotus hæmorrhoïus* (Gmel.). Purchased.
2 Piping Crows. *Gymnorhina leuconota*, Gould. Deposited by Mr. Wilson.
25. 1 Sandwich-Island Goose. *Chloëphaga sandvicensis* (Vig.). Purchased.
1 Plumed Quail. *Callipepla picta* (Douglas). Purchased.
27. 8 Starfishes. Presented by T. F. Buckland, Esq.
1 Black-cheeked Falcon. *Falco melanogenys*, Gould. Purchased.
1 Lanner Falcon. *Falco lanarius*, Schleg. Presented by J. H. Cochrane, Esq., F.Z.S.
28. 1 Ocelot. *Felis pardalis*, Linn. Deposited by Mr. Greey.
1 West-Indian Boa. *Boa diviniloqua*. Deposited by Mr. Greey.
1 Scorpion Terrapen. *Cinosternon scorpioides*, Gray. Deposited by Mr. Greey.
1 ♂ Eland. *Oreas canna* (Pall.). Purchased.
1 Common Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by Mrs. Phillips.
1 Three-toed Sloth. *Bradypus tridactylus*, Linn. Presented by Edward Greey, Esq., C.M.Z.S.
1 ♀ Barbary Turtledove. *Turtur risorius* (Linn.). Received in exchange.
500 Grayling-Ova. *Thymallus vexillifer*, Agassiz. Presented by Rev. H. Hudson.
29. 5 Ruddy-headed Geese. *Chloëphaga rubidiceps*, Sclater. Hatched.
1 Rhebok Antelope. *Pelea capreola* (Licht.). Presented by Edmund R. Wodehouse, Esq.
1 Egyptian Vulture. *Neophron percnopterus* (Linn.). Presented by Edmund R. Wodehouse, Esq.
30. 1 ♂ Sambur Deer. *Cervus aristotelis*, Cuv. Born.

May 1. 12 Alpine Newts. *Triton alpestris*, Laur. Purchased.
1 Philippine Parrakeet. *Loriculus culacissi* (Vieill.). Purchased.
1 Capuchin Monkey. *Cebus apella* (Linn.). Presented by Major Aldridge.
1 Annulated Terrapen. *Emys annulata*, Gray. Presented by O. Salvin, Esq., F.Z.S.
2. 2 Tasmanian Wolves. *Thylacinus cyanocephalus*, Harris. Presented by Ronald Gunn, Esq.
3. 1 Yellow-cheeked Lemur. *Lemur xanthomystax*, Gray. Deposited.
1 Long-eared Owl. *Otus vulgaris* (Linn.). Presented by E. Blyth, Esq., C.M.Z.S.
4. 6 Upland Geese. *Chlœphaga magellanica* (Gmel.). Hatched.
1 Sondaic Ox. *Bos sondaicus*, Müll. Presented by Col. A. P. Phayre, C.M.Z.S.
1 Long-billed Butcher-Bird. *Barita destructor*, Temm. Presented by C. Clifton, Esq., F.Z.S.
6. 1 pair of Wonga-wonga Pigeons. *Leucosarcia picata* (Lath.). Purchased.
1 Raccoon. *Procyon lotor* (Linn.). Presented by W. H. Adam, Esq.
8. 1 ♂ Giraffe. *Camelopardalis giraffa*, Gmel. Born.
A collection of Actiniæ. Purchased.
13 Alpine Newts. *Triton alpestris*, Laur. Presented by Dr. Weinland.
9. 1 pair of Wapiti Deer. *Cervus canadensis*, Briss. Deposited by Viscount Powerscourt, F.Z.S.
2 Egyptian Foxes. *Canis niloticus*, Geoff. Presented by Thomas Blackwall, Esq.
A collection of Marine Animals. Purchased.
2 Black Bullfinches. *Melopyrrha nigra* (Linn.). Purchased.
6 Melodious Finches. *Phonipara canora* (Gmel.). Purchased.
2 Olive Finches. *Phonipara olivacea* (Linn.). Purchased.
1 White-fronted Parrot. *Chrysotis leucocephalus* (Gmel.). Purchased.
1 Yellow-cheeked Conure. *Conurus chrysogenys*, Mass. et Souc. Purchased.
10. 1 Aoudad. *Ovis tragelaphus*, Desm. Born.
A collection of Marine Animals. Presented by Dr. Salter, F.Z.S.
11. 1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by A. Sarjeant, Esq.
12. 1 Woodcock. *Scolopax rusticola*, Linn. Presented by C. E. Boothby, Esq.
13. 4 Common Wolves. *Canis lupus*, Linn. Born.
1 Smooth Snake. *Coronella lævis*, Lacép. Presented by Arthur Adams, Esq.
14. 2 Collared Peccaries. *Dicotyles tajaçu* (Linn.). Born.
1 Ring-necked Parrakeet, yellow variety. *Palæornis torquatus* (Linn.). Deposited by Lady Susan Ramsay.
15. 4 Ruddy Sheldrakes. *Casarca rutila* (Pall.). Hatched.
1 Bronze-winged Pigeon. *Phaps chalcoptera* (Lath.). Hatched.
1 Cambayan Turtledove. *Turtur senegalensis* (Linn.). Hatched.
1 Cheetah. *Felis jubata*, Schreb. Deposited.
16. 1 Spotted Cuckoo. *Oxylophus glandarius* (Lath.). Presented by S. H. Cochrane, Esq., F.Z.S.
2 Madeiran Lizards. *Teira punctata*, Gray. Presented by Walter de Grey, Esq.

May 16. 6 Bennett's Wallabies. *Halmaturus bennettii*, Waterh. Deposited.
17. 2 Swift Parrakeets. *Lathamus discolor* (Shaw). Purchased.
18. 1 Greater Spotted Woodpecker. *Picus major*, Linn. Purchased.
1 Ruff. *Machetes pugnax* (Linn.). Purchased.
19. 1 Bonnet Monkey. *Macacus radiatus* (Shaw). Presented by W. Pulley, Esq,
2 Common Bluebirds. *Sialia wilsoni*, Swains. Purchased.
4 Ruffs. *Machetes pugnax* (Linn.). Purchased.
1 Turquoisine Parrakeet. *Euphema pulchella* (Shaw). Sent by Mr. Walker.
20. 3 Ashy-headed Geese. *Chloëphaga poliocephala*, Gray. Hatched.
8 Summer Ducks. *Aix sponsa* (Linn.). Hatched.
2 Brazilian Tortoises. *Testudo tabulata*, Walb. Presented by D. C. Munro, Esq., H. B. M. Consul, Surinam.
25. 1 Blessbok Antelope. *Damalis albifrons* (Burch.). Deposited by the Emperor of the French.
26. 1 Undulated Grass-Parrakeet. *Melopsittacus undulatus* (Shaw). Presented by Dr. Sharpley.
1 pair of Mountain-Witch Doves. *Geotrygon cristata* (Temm.). Presented by J. T. Telfer, Esq.
27. 6 Gannet-Eggs. *Sula bassana*, Linn. Presented by Edward Harget, Esq.
28. 1 Common Sea-Eagle. *Haliaëtus albicilla* (Linn.). Presented by J. Rendell, Esq.
29. 2 ♂ ♀ Sonnerat's Jungle-fowls. *Gallus sonneratii*, Temm. Presented by Col. Denison, F.Z.S.
1 Ocelot. *Felis pardalis*, Linn. Deposited by Mr. Greey.
1 Antillean Boa. *Boa diviniloqua*, Dum. et Bibr. Presented by the Rev. E. Cavendish Taylor, F.Z.S.
1 Dorsal Snake. *Philodryas dorsalis*, Günth. From Porto Rico. Presented by the Rev. E. Cavendish Taylor, F.Z.S.
30. 1 Smooth Snake. *Coronella lævis*, Lacép. Presented by Dr. Salter, F.Z.S.
5 Marbled Newts. *Triton marmorata*, Lat. Presented by H. Woodward, Esq., F.Z.S.
31. 13 Green Lizards. *Lacerta viridis*, Linn. Presented by — Fenton, Esq.
2 Common Adders. *Pelias berus*, Merr. Presented by — Fenton, Esq.
2 Æsculapian Snakes. *Coluber æsculapii*, Sturm. Presented by — Fenton, Esq.

June 1. 5 Mandarin Ducks. *Aix galericulata* (Linn.). Hatched.
3 Yellow-billed Ducks. *Anas xanthorhyncha*, Forst. Hatched.
2. 4 Bahama Ducks. *Pœcilonetta bahamensis* (Linn.). Hatched.
12 Spotted Salamanders. *Salamandra maculosa* (Linn.). Purchased.
3. 1 Punjab Wild Sheep. *Ovis cycloceros*, Hutton. Purchased.
1 Red Brocket Deer. *Cervus rufus*, F. Cuv. Purchased.
1 pair Green-backed Porphyrios. *Porphyrio smaragdinus.*, Temm. Purchased.
1 Common Adder. *Pelias berus*, Merr. Presented by Rev. W. Lee.
5. 4 Murray Cod. *Galaxias scriba*. Presented by Capt. Ridges.
1 Hawk's-billed Turtle. *Caretta imbricata*. Presented by E. W. H. Holdsworth, Esq., F.Z.S.
6. 2 African Wild Pigs. *Sus scrofa*, Linn., var. Presented by A. Christy, Esq.

June 6. 1 Crested Pigeon. *Ocyphaps lophotes* (Temm.). Received in exchange.

8. 2 Impeyan Pheasants. *Lophophorus impeyanus* (Lath.). Hatched.
1 Mantchourian Crane. *Grus montignesia* (Vieill.). Hatched.
3 Coots, between Crested and Common species—*Fulica cristata*, Lath., and *F. atra*, Linn. Hatched.
1 Arabian Baboon. *Cynocephalus hamadryas* (Linn.). Deposited by Lord Londesborough.
2 Gigantic Salamanders. *Sieboldia maxima* (Schleg.). Deposited.
1 West African Tantalus. *Tantalus ibis*, Linn. Purchased.

9. 1 ♂ Eland. *Oreas canna* (Pall.). Born.
1 Common Boa. *Boa constrictor*, Linn. Presented by G. R. Perry, Esq., British Consulate, Para.
1 Pallas's Sandgrouse. *Syrrhaptes paradoxus* (Pall.). Presented by A. Newton, Esq., F.Z.S.
1 Common Wombat. *Phascolomys wombat*, Pér. et Les. Deposited.

10. 1 Pied Mynah. *Sturnopastor contra* (Linn.). Purchased.
1 Red Kangaroo. *Macropus rufus* (Desm.). Deposited.

11. 2 Bronze-winged Pigeons. *Phaps chalcoptera* (Lath.). Hatched.
2 Cambayan Turtledoves. *Turtur senegalensis* (Linn.). Hatched.
1 Kingfisher. *Alcedo ispida*, Linn. Presented by P. Symonds, Esq.

12. 2 Balearic Crowned Cranes. *Balearica pavonina*, Briss. Deposited.
1 Summer Duck. *Aix sponsa* (Linn.). Deposited.
4 Common Jays. *Garrulus glandarius* (Linn.). Purchased.
1 Greater Spotted Woodpecker. *Picus major*, Linn. Purchased.
2 Black-backed Porphyrios. *Porphyrio melanotus*, Temm. Deposited.
2 Laughing Kingfishers. *Dacelo gigantea* (Lath.). Deposited.
1 Emu. *Dromæus novæ-hollandiæ*, Vieill. Deposited.
2 Water-Tortoises. Deposited.
1 Pig-tailed Monkey. *Macacus nemestrinus* (Linn.). Presented by Wm. Jaffray, Esq.

13. 1 Red Ground-Dove. *Geotrygon montana* (Linn.). Hatched.

14. 1 Eland (female). *Oreas canna* (Pall.). Born.

16. 2 Blue-headed Pigeons. *Starnœnas cyanocephala* (Linn.). Purchased.

17. 1 Mooruk. *Casuarius bennettii*, Gould. Hatched.
3 Horned Pheasants. *Ceriornis satyra* (Cuv.). Hatched.
3 Impeyan Pheasants. *Lophophorus impeyanus* (Lath.). Hatched.
7 Japanese Pheasants. *Phasianus versicolor*, Temm. Hatched.
4 Cheer Pheasants. *Catreus wallichii* (Hardw.). Hatched.

18. 1 Common Peccary. *Dicotyles tajaçu* (Linn.). Deposited.
1 Marmoset Monkey. *Hapale jacchus* (Linn.). Deposited.

19. 3 Pied Wagtails. *Motacilla yarrellii*, Gould. Hatched.
1 Grey Parrot. *Psittacus erythacus*, Linn. Deposited.

20. 1 Yak. *Bos grunniens*, Linn. Born.
4 Barn-Owls. *Strix flammea*, Linn. Purchased.

22. 4 Kingfishers. *Alcedo ispida*, Linn. Presented by Edw. Lukyn, Esq.

23. 1 Common Crane. *Grus cinerea*, Bechst. Hatched.
3 Common Chameleons. *Chamæleo vulgaris*, Daud. Presented.

24. 1 Mexican Deer. *Cervus mexicanus*, H. Smith. Presented by Edw. Sheldon, Esq.
1 Hawk's-billed Turtle. *Caretta imbricata* (Linn.). Presented by Edw. Sheldon, Esq.

June 26. 1 Herring-Gull. *Larus argentatus*, Brünn. Hatched.
1 Bramble-Finch. *Fringilla montifringilla*, Linn. Presented by Mr. Bartlett.
A collection of Marine Animals. Presented by Viscount Hamilton, F.Z.S.
27. 1 Coatie Spider Monkey. *Ateles paniscus* (Linn.). Purchased.
1 Pinche Monkey. *Hapale œdipus* (Linn.). Purchased.
28. 1 Golden Agouti. *Dasyprocta aguti* (Linn.). Born.
3 Horned Pheasants. *Ceriornis satyra* (Cuv.). Hatched.
29. 3 White-throated Sapajous. *Cebus hypoleucus*, Geoff. Purchased.
1 White-fronted Capuchin Monkey. *Cebus albifrons*, Geoff. Purchased.
2 Spider Monkeys. *Ateles ater*, F. Cuv. Purchased.
1 Brown Coati. *Nasua narica* (Linn.). Purchased.
1 Kinkajou. *Cercoleptes caudivolvulus*, Ill. Purchased.
1 Azara's Fox. *Canis azaræ*, Pr. Max. Purchased.
4 Wild Ducks. *Anas boschas*, Linn. Presented by — Coxe, Esq.
1 Rufous Francolin. *Galloperdix spadiceus* (Gmel.). Purchased.
1 Common Boa. *Boa constrictor*, Linn. Presented by Capt. Abbott.
30. 1 Allen's Galago. *Galago allenii*, Waterh. Presented by W. H. Ashmall, Esq., C.M.Z.S.

July 1. 1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by M. Bernard.
2. 2 Smooth Snakes. *Coronella lævis*, Lacép. Purchased.
3. 2 Cambayan Turtledoves. *Turtur senegalensis* (Linn.). Hatched.
1 Crested Ground-Parrakeet. *Calopsitta novæ-hollandiæ* (Gmel.). Hatched.
A collection of Marine Animals. Purchased.
1 pair of Cereopsis Geese. *Cereopsis novæ-hollandiæ*, Lath. Deposited by the Société d'Acclimatation, Paris.
2 Long-necked Chelodines. *Chelodina longicollis* (Shaw). Deposited by the Société d'Acclimatation, Paris.
5. 2 Common Kites. *Milvus regalis*, Briss. Presented by Henry Oakley, Esq., R.N.
1 Common Barn-Owl. *Strix flammea*, Linn. Presented by P. D. Boyle, Esq.
6. 1 Common Boa. *Boa constrictor*, Linn. Presented by H. B. M. Consul, Pernambuco.
A collection of Marine Animals. Purchased.
1 Grey Ichneumon. *Herpestes griseus* (Geoff.). Deposited.
7. 2 Peewits. *Vanellus cristatus*, Linn.
5 Horned Tragopans. *Ceriornis satyra* (Cuv.). Hatched.
8. A collection of Marine Animals. Presented by A. H. Wylie, Esq.
2 Slow Loris. *Stenops tardigradus* (Linn.). Presented by Dr. Thomas Coghlan.
9. 1 Red-tailed Buzzard. *Buteo borealis* (Gmel.). Presented by Dr. Slack.
10. 1 Plumed Colin. *Callipepla picta* (Douglas). Purchased.
1 Indian Grakle. *Gracula intermedia*, Hay. Presented by G. C. Goldsmith, Esq.
1 Gazelle. *Gazella dorcas* (Linn.). Deposited.
11. 1 Cereopsis Goose. *Cereopsis novæ-hollandiæ* (Lath.). Deposited.
2 Proteus. *Proteus anguinus* (Shaw). Presented by T. H. Chambers, Esq.
14. 3 Impeyan Pheasants. *Lophophorus impeyanus* (Lath.). Hatched

July 14. 8 Japanese Pheasants. *Phasianus versicolor*, Temm. Hatched.
3 Cheer Pheasants. *Catreus wallichii* (Hardw.). Hatched.
2 Brazilian Tanagers. *Ramphocelus brasilius* (Linn.). Purchased.
15. 1 Horned Tragopan. *Ceriornis satyra* (Cuv.). Hatched.
16. 1 Rattle-Snake. *Crotalus horridus*. Purchased.
1 Green Snake. Purchased.
1 Fierce Snake. *Tropidonotus ferox*, Günth. Purchased.
1 West African Tantalus. *Tantalus ibis*, Linn. On approval.
1 Fraser's Eagle-Owl. *Bubo poensis*, Fraser. On approval.
18. 1 Echidna. *Echidna hystrix*, Cuv. Presented by E. T. Smith, Esq.
1 Greater Sulphur-crested Cockatoo. *Cacatua galerita* (Lath.). Deposited.
22. 1 Japanese Deer, ♂. *Cervus sika*, Temm. Born.
4 Pied Wagtails. *Motacilla yarrellii*, Gould. Hatched.
23. 1 Common Zebra. *Asinus zebra*, Gray. Deposited by the Société d'Acclimatation, Paris.
1 Cape Hyrax. *Hyrax capensis*, Schreb. Deposited by the Société d'Acclimatation, Paris.
2 Egyptian Geese. *Chenalopex ægyptiaca* (Briss.). Deposited by the Société d'Acclimatation, Paris.
4 Lions. *Felis leo*, Linn. Born.
1 Wonga-wonga Pigeon. *Leucosarcia picata* (Lath.). Hatched.
2 Bronze-winged Pigeons. *Phaps chalcoptera* (Lath.). Hatched.
2 Long-eared Owls. *Otus vulgaris* (Linn.). Purchased.
1 pair of Crossbills. *Loxia curvirostra*, Linn. Purchased.
1 Prairie-Marmot. *Arctomys ludovicianus*, Ord. Presented by Capt. James Downie.
1 Rose-crested Cockatoo. *Cacatua rosacea* (Lath.). Deposited.
24. 2 Hybrid Peafowls. Between ♂ *Pavo nigripennis*, Sclater, and ♀ *P. cristatus*, Linn. Hatched.
2 Turquoisine Parrakeets. *Euphema pulchella* (Shaw). Hatched.
1 King Vulture. *Gyparchus papa* (Linn.). Presented by D. Powell, Esq., jun.
1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by E. Cheme, Esq.
25. 1 Hawk's-billed Turtle. *Caretta imbricata*. Presented by F. T. Buckland, Esq., F.Z.S.
26. 1 Sturgeon. *Acipenser sturio*, Linn. Purchased.
27. 4 Bartlett's Pigeons. *Phlogœnas bartlettii*, Sclater. Purchased.
6 King Crabs. *Limulus polyphemus*. From Liverpool.
28. 3 Common Kingfishers. *Alcedo ispida*, Linn. Presented by J. Marshall, Esq.
29. 1 Black Rat. *Mus rattus*, Linn. Purchased.
1 Geoffroy's Spider Monkey. *Ateles geoffroyi*, Kuhl. Presented by Edward Greey, Esq., C.M.Z.S.
1 Crested Screamer. *Chauna chavaria* (?) (Temm.). Presented by Edward Greey, Esq., C.M.Z.S.
1 Golden Tench. *Tinca vulgaris*. Presented by F. T. Buckland, Esq., F.Z.S.
1 Three-toed Sloth. *Bradypus tridactylus*, Linn. Presented by R. G. Meek, Esq.
1 Marmoset Monkey. *Hapale jacchus* (Linn.). Deposited.
30. 1 Common Paradoxure. *Paradoxurus typus*, F. Cuv. Presented by T. Frost, Esq.
31. 1 Brown Capuchin Monkey. *Cebus capucinus* (Linn.). Presented by C. Clifton, Esq., F.Z.S.

Aug. 1. 1 Patas Monkey. *Cercopithecus ruber* (Gmel.). Presented by G. E. Stanley, Esq.
2. 1 ♂ Japanese Deer. *Cervus sika*, Temm. Born.
3. 1 pair Variegated Sheldrakes. *Casarca variegata* (Gmel.). Presented by J. D. Tetley, Esq.
1 Capuchin Monkey. *Cebus albifrons*, Geoff. Deposited.
5. 1 White Egret. *Egretta candidissima*. Presented by H. Vignoles, Esq.
1 Common Jackal. *Canis aureus*, Linn. Presented by — Brown, Esq.
6. 1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by W. B. Watson, Esq.
1 Solitary Thrush. *Petrocincla cyanea* (Linn.). Presented by Sir W. H. Fielden.
7. 1 Land-Rail. *Crex pratensis*, Bechst. Purchased.
4 Night-Herons. *Nycticorax europæus*, Steph.
8. 1 Mealy Amazon. *Chrysotis farinosa* (Bodd.). Presented by H. J. Aveling, Esq.
2 Eryx Snakes. *Eryx jaculus*, Daud. Purchased.
2 Clifford's Snakes. *Zamenis cliffordii* (Schl.). Purchased.
2 Four-lined Snakes. *Coluber quadrilineatus* (Pall.). Purchased.
2 Sand-Asps. *Vipera ammodytes*, Klein. Purchased.
2 Green-and-Yellow Snakes. *Coluber viridiflavus*. Purchased.
1 Bosk's Spine-foot. *Aconti'actylus boskianus*. Purchased.
2 Ocellated Lizards. *Gongylus ocellatus* (Daud.). Purchased.
9. 1 ♀ Eland. *Oreas canna* (Pall.). Born.
10. 1 Cariama. *Cariama cristata*, Linn. Presented by William Downing, Esq.
11. 1 Egyptian Goose. *Chenalopex ægyptiaca* (Briss.). Deposited.
2 Sacred Ibis. *Geronticus æthiopicus* (Lath.). Deposited.
3 Radiated Tortoises. *Testudo radiata*. Deposited.
1 Jelerang Squirrel. *Sciurus bicolor*, Sparrm. Deposited.
1 Ground-Squirrel. *Xerus*, sp.? Deposited.
12. 3 Tigers. *Felis tigris*, Linn. Born.
1 Mountain-Witch Dove. *Geotrygon cristata* (Temm.). Hatched.
2 Cambayan Turtledoves. *Turtur senegalensis* (Linn.). Hatched.
1 Herring-Gull. *Larus argentatus*, Brünn. Presented by C. Barn, Esq.
2 Alligators. *Alligator mississippiensis* (Daud.). Purchased.
1 Fraser's Eagle-Owl. *Bubo poensis*, Fraser. Purchased.
1 Barred Owl. *Syrnium nebulosum* (Forst.). Purchased.
2 Nonpareil Finches. *Cyanospiza ciris* (Wils.). Purchased.
2 Dufresne's Waxbills. *Estrelda dufresnii* (Vieill.). Purchased.
13. 1 Cuckoo. *Cuculus canorus*, Linn. Presented by Mr. A. S. Yates.
14. 2 Common Rheas. *Rhea americana*, Vieill. Hatched.
1 Red-headed Cardinal. *Paroaria dominica* (Linn.). Presented by Mrs. Croskey.
1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by J. Symonds, Esq.
2 Marsh Harriers. *Circus æruginosus* (Linn.). Presented by Mr. A. S. Yates.
15. 1 Barn-Owl. *Strix flammea*, Linn. Purchased.
16. 1 Maltese Snake. Presented by Charles Wright, Esq.
17. 4 Bartlett's Pigeons. *Phlegœnas bartlettii*, Sclater. Purchased.
18. 1 Alexandrine Parrakeet. *Palæornis alexandri* (Linn.). Deposited.
19. 2 Australian Lizards. Presented by G. Krefft, Esq., C.M.Z.S.
2 Australian Frogs. Presented by G. Krefft, Esq., C.M.Z.S.

Aug. 20. 1 Common Cuckoo. *Cuculus canorus*, Linn. Presented.
21. 1 King's Parrakeet. *Aprosmictus scapulatus* (Bechst.). Presented by Sir J. Cathcart.
1 Bauer's Parrakeet. *Platycercus zonarius* (Shaw). Presented by Sir J. Cathcart.
1 Pale-headed Parrakeet. *Platycercus palliceps*, Vig. Presented by Sir J. Cathcart.
22. A collection of Marine Animals. Presented by Dr. Salter.
A collection of Marine Animals. Purchased.
1 Cuttlefish. Purchased.
24. 1 Toque Monkey. *Macacus pileatus* (Shaw). Deposited.
25. 1 pair Bennett's Kangaroos. *Halmaturus bennettii*, Waterh. Deposited.
26. 1 Common Chameleon. *Chamæleo vulgaris*, Daud. Presented by W. Gass, Esq.
1 Peewit. *Vanellus cristatus*, Meyer. Presented by Mr. Bergmann.
28. 1 Howling Monkey. *Mycetes ursinus* (Humb.). Presented by Edward Greey, Esq., C.M.Z.S.
13 South American Lizards. Presented by Capt. Abbott.
1 Howling Monkey. *Mycetes ursinus* (Humb.). Purchased.
30. A collection of Medusæ. *Anthea cereus*. Presented by — Hindly, Esq.
31. 3 Greek Partridges. *Caccabis saxatilis*, Bechst. Presented by A. H. Layard, Esq., M.P.
1 Crested Pigeon. *Ocyphaps lophotes*, Temm. Purchased.

Sept. 2. 1 Wanderoo Monkey. *Silenus veter* (Linn.). Presented by Capt. Pocklington, 18th Regt.
A collection of Marine Animals. Presented by Lady Cust.
3. 1 Naked-eyed Pigeon. *Columba gymnophthalma*, Temm. Hatched.
2 Cornish Choughs. *Fregilus graculus*, Cuv. Presented by W. B. Scott, Esq.
4. 1 pair Great Bustards. *Otis tarda*, Linn. Deposited.
1 Crested Quail. *Eupsychortyx cristatus* (Linn.). Purchased.
5. 1 Smooth Snake. *Coronella lævis*, Lacép. Presented by W. Penny, Esq.
9. 1 Indian Python. *Python molurus* (Linn.). On approval.
10. 1 Common Jackal. *Canis aureus*, Linn. Presented by J. Millar, Esq.
1 Red-breasted Pigeon. *Phlogœnas cruentata* (Lath.). Purchased.
11. 2 Common Cuckoos. *Cuculus canorus*, Linn. Presented by R. F. Lascelles, Esq., jun.
12. 1 ♂ Indian Elephant. *Elephas indicus*, Linn. Presented by C. H. R. Cocq, Esq.
12 Flounders. *Platessa flesus* (Linn.). Presented by A. Arcedeckne, Esq., F.Z.S.
A collection of Marine Animals. Purchased.
14. 1 Piedmontese Calf. *Bos taurus*, Linn., var. Born.
15. 1 Raven. *Corvus corax*, Linn. Presented by Dr. Bree.
16. 2 Japanese Pheasants. *Phasianus versicolor*, Temm. Hatched.
1 ♂ Molucca Deer. *Cervus moluccensis*, Müll. Purchased.
1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by M. Möller.
1 pair Undulated Grass Parrakeets. *Melopsittacus undulatus* (Shaw). Deposited.
17. 1 Hyrax. *Hyrax capensis*, Schreb. Presented by Lieut.-General Wynyard.

Sept. 18. 1 Mauge's Opossum. *Dasyurus maugæi*, Geoff. Presented by Rev. E. Selwyn.
19. 1 Indian Civet Cat. *Viverricula indica* (Geoff.). Presented by F. W. Robins, Esq.
21. 1 Sambur Deer, ♂. *Cervus aristotelis*, Cuv. Born.
22. 1 Brush-Turkey. *Talegalla lathami*, Gray. Presented by C. Moore, Esq.
1 Black-backed Porphyrio. *Porphyrio melanotus*, Temm. Presented by Dr. Mueller, C.M.Z.S.
2 Wonga-wonga Pigeons. *Leucosarcia picata* (Lath.). Presented by Dr. Mueller, C.M.Z.S.
3 Australian Sheldrakes. *Casarca tadornoides*, Jard. et Selb. Presented by the Acclimatization Society of Victoria.
2 West African Gallinules. Purchased.
1 Kangaroo. *Macropus*, sp.? Deposited.
23. 3 German Loach. *Cobitis fossilis*. On approval.
A Collection of Edible Frogs. *Rana esculenta*, Linn.
24. 1 ♂ Giraffe. *Camelopardalis giraffa*, Gm. Born.
1 Indian Python. *Python molurus* (Linn.). Purchased.
25. 2 Red Deer. *Cervus elaphus*, Linn. Deposited.
2 Small-spotted Dogfish. *Scyllium canicula* (Linn.). Purchased.
26. 1 Vervet Monkey. *Cercopithecus lalandii*, Is. Geoff. Deposited.
28. 1 ♂ Persian Deer. *Cervus wallichii*, Cuv. Born.
1 Vervet Monkey. *Cercopithecus lalandii*, Is. Geoff. Presented by E. B. Kennedy, Esq.
5 Lizards. *Iguana tuberculata*, Laur., et *Anolis cristatella*, Dum. et Bibr. Presented by Capt. Sawyer.
1 Spotted Cavy. *Cœlogenys paca* (Linn.). Presented by Dr. Huggins.
1 Owl. Presented by R. Swift, Esq., C.M.Z.S., St. Thomas's.
1 Egyptian Monitor. *Monitor niloticus*, Hasselq. Purchased.
29. 3 Diamond Snakes. *Morelia spilotes* (Lacép.). Presented by G. Krefft, Esq.
5 Australian Toads. *Pseudophryne australis*. Presented by G. Krefft, Esq.
1 Bearded Lizard. *Grammatophora barbata*.
1 African Leopard. *Felis varia* (Gray). On approval.
4 Hyrax. *Hyrax capensis*, Schreb. Purchased.
30. 3 Red-backed Shrikes. Purchased.

Oct. 1. 1 Frugivorous Bat. *Pteropus medius*, Temm. Presented by Edw. W. Baychut, Esq.
2. 2 Humboldt's Lagothrix. *Lagothrix cana*, Humbdt. Purchased.
1 Squirrel Monkey. *Callithrix sciureus* (Linn.). Purchased.
2 Barred Turtledoves. *Geopelia striata* (Linn.). Purchased.
2 Swift Parrakeets. *Lathamus discolor* (Shaw). Received in exchange.
1 pair Dusky Ducks. *Anas obscura*, Gm. Presented by A. Downs, Esq., of Halifax, C.M.Z.S.
4 Garter Snakes. *Tropidonotus ordinatus*. Presented by A. Downs, Esq., of Halifax, C.M.Z.S.
1 Grass-Snake. *Cyclophis vernalis*, De Kay. Presented by A. Downs, Esq., of Halifax, C.M.Z.S.
3. 1 Capuchin Monkey. *Cebus apella* (Linn.). Presented by W. C. Kelaart, Esq.
4. 1 Pale Genet. *Genetta pallida*, Gray. Presented by J. J. Monteiro, Esq.

Oct. 5. 2 Turquoisine Parrakeets. *Euphema pulchella* (Shaw). Hatched.
1 White-backed Piping Crow. *Gymnorhina leuconota*, Gould. To be taken care of.
7. 1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by F. A. Burton, Esq.
6 Arctic Foxes. *Canis lagopus*, Linn. Presented by Capt. Stewart.
2 Great Eagle-Owls. *Bubo maximus* (Aldrov.). Presented by Capt. Stewart.
8. A collection of Marine Fishes. Presented by Dr. Salter, F.Z.S.
1 Bonnet Monkey. *Macacus radiatus* (Shaw). Presented by G. W. Robinson, Esq.
10. 1 ♂ Persian Deer. *Cervus wallichii*, Cuv. Born.
1 young Ostrich. *Struthio camelus*, Linn. Presented by E. Hertslet, Esq.
2 ♂ Great Bustards. *Otis tarda*, Linn. Purchased.
5 Indigo Birds. *Cyanospiza cyanea* (Linn.). Purchased.
1 Buzzard. Purchased.
12. 3 White Peafowl. *Pavo cristatus*, Linn., var. Purchased.
1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Deposited.
1 Black Bear. *Ursus americanus*, Pall. Capt. Herd.
1 Golden Eagle. *Aquila chrysaëtos* (Linn.). Capt. Herd.
1 Duck-Falcon. *Falco anatum*, Bonap. Capt. Herd.
2 Virginian Owls. *Bubo virginianus* (Gm.). Capt. Herd.
13. 1 pair Razor-billed Curassows. *Pauxi mitu* (Linn.). Presented by the Prince de Joinville.
1 Banded Curassow. *Crax fasciolata*, Spix. Presented by the Prince de Joinville.
1 White-crested Guan. *Penelope leucolopha*, Mey. Presented by the Prince de Joinville.
2 Red and Yellow Maccaws. *Ara chloroptera*, Gray. Presented by the Prince de Joinville.
1 Gannet. *Sula bassana*, Linn. Presented by Miss Yardley.
1 African Lepidosiren, River Zambesi. *Protopterus annectans*, Owen. Presented by Dr. John Kirk.
14. 1 Ring-Ousel. *Turdus torquatus*, Linn. Purchased.
15. 1 Common Porpoise. *Phocæna communis*, Less. Purchased.
1 Common Cuckoo. *Cuculus canorus*, Linn. Presented by J. Currie, Esq.
1 White-faced Tree-Duck. *Dendrocygna viduata* (Linn.). Received in exchange.
1 Norway Lemming. *Lemmus norvegicus* (Worm). Presented by W. Bell, Esq.
16. 2 Common Peccaries. *Dicotyles tajacu* (Linn.). Born.
17. 1 Common Boa. *Boa constrictor*, Linn. Purchased.
1 Spotted Eagle. *Aquila nævia* (Gm.). Purchased.
19. 1 Vervet Monkey. *Cercopithecus lalandii*, Is. Geoff. Presented by H. Hewitt, Esq.
22. 1 Coypu. *Myopotamus coypu* (Mol.). Presented by Capt. Hutchkiss.
23. 1 Laland's Long-eared Fox. *Otocyon lalandii* (Desm.). Presented by J. Joshua Barry, Esq.
3 Rhesus Monkeys. *Macacus erythræus* (Schreb.). Presented by W. Lloyd, Esq.
1 Indian Rat Snake. *Coryphodon blumenbachii* (Merr.). Presented by Dr. Shortt, F.Z.S.
1 Sand-Snake. Presented by Dr. Shortt, F.Z.S.

Oct. 24. 1 Common Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by J. H. Eden, Esq.
26. 1 Hybrid Jaguar. Between ♂ *Felis onca*, Linn., and ♀ *F. hernandesii*, Gray. Born.
1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by — Halesworth, Esq.
1 Honey-Buzzard. *Pernis apivorus* (Linn.). Presented by Sir Charles Esham, Bart.
5 White-backed Piping Crows. *Gymnorhina leuconota*, Gould.
28. 1 pair Crested Ground-Parrakeets. *Calopsitta novæ-hollandiæ* (Gm.). Deposited.
29. 1 Crested Screamer. *Chauna chavaria* (?) (Temm.). Purchased.
1 Brazilian Caracara. *Polyborus brasiliensis* (Gm.). Purchased.
1 American Snake.
5 American Lizards.
1 Ring-necked Parrakeet. *Palæornis torquata* (Linn.). Deposited.
2 Jerelang Squirrels. *Sciurus bicolor*, Sparrm. Deposited.
30. 1 Crocodile. *Crocodilus americanus*. Purchased.
1 Buzzard. *Buteo tachardus*. Purchased.
1 Kite. *Milvus parasiticus*. Purchased.
31. 1 Tortoise.

Nov. 4. 1 Great Kangaroo. *Macropus major*, Shaw. Presented by the Acclimatization Society of Victoria.
2 White-backed Piping Crows. *Gymnorhina leuconota*, Gould. Deposited.
7 South American Ground-Doves. Presented by Capt. Abbott.
1 Spotted Cavy. *Cœlogenys paca* (Linn.). Presented by George Samuel Lennon Hunt, Esq.
6. 30 Common Pheasants. *Phasianus colchicus*, Linn. Purchased.
7. 1 ♀ Great Bustard. *Otis tarda*, Linn. Purchased.
9. 2 Stockdoves. *Columba œnas*, Linn. Presented by John Fletcher, Esq.
1 Rosy Cockatoo. *Cacatua roseicapilla*, Vieill. Deposited.
1 Leadbeater's Cockatoo. *Cacatua leadbeateri* (Vig.). Deposited.
10. 2 Raccoons. *Procyon lotor* (Linn.). Presented by Egbert W. Cooper, Esq.
1 Long-eared Owl. *Otus vulgaris* (Linn.). Presented by — Peacock, Esq.
1 Rhesus Monkey. *Macacus erythræus* (Schreb.). Presented by Robert Langley, Esq.
13. 1 Rose-crested Cockatoo. *Cacatua rosacea* (Lath.). Presented by Mrs. Moss King.
14. 1 pair of White Pheasants. *Phasianus colchicus*, Linn., var. Purchased.
1 Stanley Parrakeet. *Platycercus icterotis* (Temm.). Deposited.
2 Barnard's Parrakeets. *Platycercus barnardii* (Lath.). Deposited.
2 Adelaide Parrakeets. *Platycercus adelaidæ*, Gould. Deposited.
2 Crested Ground-Parrakeets. *Calopsitta novæ-hollandiæ* (Gm.). Deposited.
3 Undulated Grass-Parrakeets. *Melopsittacus undulatus* (Shaw). Deposited.
2 Bronze-winged Pigeons. *Phaps chalcoptera* (Lath.). Deposited.
16. 4 Water-Tortoises. Presented by Mr. A. G. Brown-Séquard.

Nov. 16. 1 Dingo and 2 puppies. *Canis dingo*, Blumenb. Presented by the Acclimatization Society of Victoria.
17. 1 Proteus. *Proteus anguinus* (Shaw). Presented by F. M. Burton, Esq.
18. 2 Sacred Ibis. *Geronticus æthiopicus* (Lath.). Purchased.
1 Toco Toucan. *Ramphastos toco*, Gm. Presented by F. Anderson, Esq.
2 Hawfinches. *Coccothraustes vulgaris*, Briss. Purchased.
19. 1 ♀ Sloth Bear. *Melursus labiatus* (Blainv.). Presented by Lieut. James Howe Mardon, 66th Regt.
20. 1 Garnett's Galago. *Otogale garnettii* (Ogilby). Purchased.
1 Common Cassowary. *Casuarius galeatus* (Vieill.). Purchased.
2 Wild Turkeys. *Meleagris gallopavo*. Purchased.
1 ♀ Nylghaie. *Portax picta* (Pall.). On approval.
1 Ostrich. *Struthio camelus* (Linn.). On approval.
1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by Capt. Soutit.
21. 1 Vervet Monkey. *Cercopithecus lalandii*, Is. Geoff. Presented by Lieut. James Howe Mardon, 66th Regt.
23. 1 Virginian Opossum. *Didelphys virginianus*, Shaw. Presented by the Hon. F. North.
3 Pope Fish. *Acerina vulgaris*. Purchased.
1 Porpoise. *Phocæna communis*, Less. Presented by J. Minton, Esq.
24. 4 pairs Californian Quails. *Lophortyx californianus* (Lath.). Purchased.
25. 2 Small Snakes. Presented by C. A. Wright, Esq.
2 Hyrax. *Hyrax capensis*, Schreb. Born.
4 *Haliotis tuberculata*. Purchased.
1 pair Summer Ducks. *Aix sponsa* (Linn.). Purchased.
1 pair Bahama Ducks. *Pœcilonetta bahamensis* (Linn.). Purchased.
26. 1 pair Globose Curassows. *Crax globicera*, Linn. Purchased.
27. 1 Sharp-snouted Snake. *Heterodon madagascariensis*. Presented by Edward Newton, Esq.
30. 1 Buzzard. Deposited.
1 Cuttlefish. Presented by Edward Sheppard, Esq.

Dec. 1. 4 Little Grebe. *Podiceps minor*, Lath. Presented by Master A. M. Hall.
2. 1 Peregrine Falcon. *Falco anatum*. Mr. Greey.
1 Black Spider Monkey. *Ateles ater*, F. Cuv. Mr. Greey.
1 Ashy-headed Goose. *Chloëphaga poliocephala*, G. R. Gray. Deposited.
3. 1 Sonnerat's Jungle-fowl. *Gallus sonnerattii*, Temm. Presented by Col. Charles Denison.
1 Rufous Spur-fowl. *Galloperdix spadicea* (Gmel.). Presented by Col. Charles Denison.
5. 1 ♀ Barasingha Deer. *Cervus duvaucellii*, Cuv. Deposited.
1 ♀ Persian Deer. *Cervus wallichii*, Cuv. Deposited.
9. 2 Servals. *Felis serval*, Schreb. Purchased.
10. 8 Gold Carp. *Cyprinus auratus*, Linn. Received from G. A. Hicks, Esq.
1 Snow-Bunting. *Plectrophanes nivalis* (Linn.). Purchased.
1 young Wolf. *Canis lupus*, Linn. Presented by the Prince de Joinville.
3 Common Chameleons. *Chamæleo vulgaris*, Daud. Deposited.

Dec. 11. 1 Molucca Deer. *Cervus moluccensis*, Müll. Born.
2 Red-breasted Pigeons. *Phlogœnas cruentata* (Lath.). Purchased.
1 Little Green-winged Dove. *Chalcophaps chrysochlora* (Wagl.). Purchased.
1 Pallas's Sandgrouse. *Syrrhaptes paradoxus* (Pall.). Presented by Lord Francis Conyngham.
12. 2 Common Squirrels. *Sciurus vulgaris*, Linn. Purchased.
2 Bearded Reedlings. *Calamophilus biarmicus* (Linn.). Purchased.
4 Cirl Buntings. *Emberiza cirlus* (Linn.). Purchased.
14. 1 Bonnet Monkey. *Macacus radiatus* (Shaw).
15. 2 Hybrid Doves. Between *Turtur auritus*, R., and *T. risorius* (Linn.). Purchased.
17. 1 Crested Ground-Parrakeet. *Calopsitta novæ-hollandiæ* (Gm.). Hatched Aug. 12, 1863.
1 Cambayan Turtledove. *Turtur senegalensis* (Linn.). Hatched Aug. 12, 1863.
2 Summer Ducks. *Aix sponsa* (Linn.). Deposited.
2 Razor-billed Curassows. *Pauxi mitu* (Linn.). Presented by Sir William Clay, Bart., F.Z.S.
1 Small South American Cat. *Felis* ——? Presented by Sir William Clay, Bart., F.Z.S.
A collection of French Trout-Spawn. From F. T. Buckland, Esq., F.Z.S.
18. 1 West African Python. *Python sebæ* (Gm.). Presented by Dr. Marchisio.
1 ♀ Sömmering's Pheasant. *Phasianus sœmmeringii*, Temm. Deposited by J. J. Stone, Esq.
19. 1 Common Badger. *Meles taxus* (Schreb.). Presented by John Boswell, Esq.
21. 1 Macaque Monkey. *Macacus cynomolgus* (Linn.). Presented by H. J. P. Cotton, Esq.
2 Hen Harriers. *Circus cyaneus* (Linn.). Presented by H. P. Hensman, Esq.
1 Tiger. *Felis tigris*, Linn. Born dead.
23. 1 Variegated Touracou. *Schizorrhis africana* (Lath.). Purchased.
26. 2 Red-headed Cardinals. *Paroaria dominica* (Linn.). Purchased.
2 Brazilian Blue Grosbeaks. *Guiraca cyanea* (Linn.). Purchased.
1 Small S. A. Bird. *Spermophila hypoleuca* (Licht.). Purchased.
1 Small S. A. Bird. *Spermophila ophthalmica*?, Sclater. Purchased.
4 Black-billed Tree-Ducks. *Dendrocygna arborea* (Linn.). Purchased.
28. 1 Chameleon (China). *Chamæleo vulgaris* (?). Presented by B. E. Spraull, Esq.
30. A collection of Marine Animals. Presented by Mr. Thompson.

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